

Significant Bits

Magazine of the Brisbug PC User Group Inc

Next meeting

Vol 8 No 9
August 1993

Sunday, 15th August

\$ 4.00

Main Event - 1:30pm

WORDPERFECT 5.2 / 6.0

Lunchtime Special - Noon

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Inside

Computers go rallying

BASIC - Part II

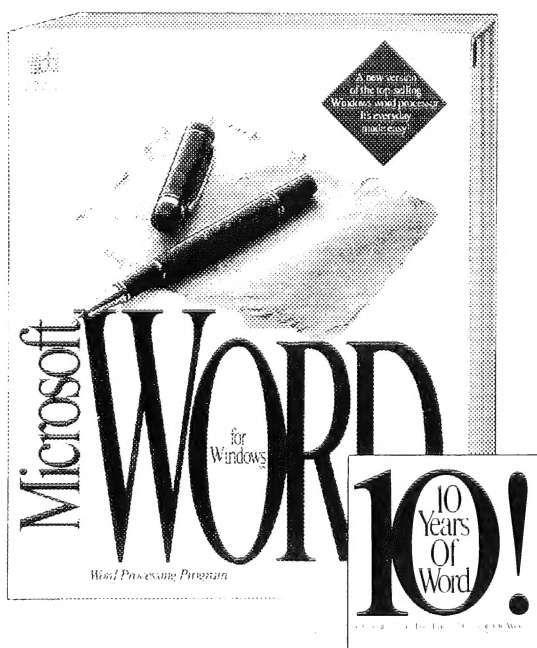
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BRISBUG PC USER GROUP Inc.

The Brisbane group for users of PC-type computers
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Significant Bits Magazine

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Deliver disks, artwork or copy to:
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DEADLINES

Normal deadlines are the third Friday of the month preceding publication. Space reservation deadline: 3rd Friday of month preceding publication. Replacement artwork deadline the last Friday of that month. Artwork must accompany space booking. If booked by phone or FAX, booking becomes effective only when artwork is received. The magazine is usually printed the second week of the month of publication, so that changes to copy must be in the preceding week.

TERMS

Payment must accompany bookings unless an account has been established. Discounts are offered for multiple insertions when advance payment is made. Members may advertise at half rate, but member payment must accompany ads (Classified ads not exceeding three lines are run free of charge. More than three lines attract a minimum charge of \$5.)

FORMAT

The magazine is A4 size, offset printed and saddle stitched. More than 2300 copies are printed of each issue and distributed throughout Australia and overseas. Artwork should be full size, paper bromide, film (right-reading emulsion down) or laser print. Postscript print or EPS files can be accepted by arrangement via modem. Brisbug does not typeset ads other than classifieds. Text only ads 1/6 or 1/12 page can be FAXED. The layout for these must be at the editor's discretion and are accepted without proofs. All sizes are given as height x width in mm. Artwork must not exceed stated sizes.

FULL PAGE SIZE DETAILS

Normal article text (3 col)	260x178
Page trim	295x208
Max assured print area	280x190
Optional bleed extent	300x215

RATES

Color covers	\$600	Doublepage spreads ..	\$500
Colour page	\$450	Colour 1/2 page	\$250
Colour 1 column	\$110	Colour 1/12 page	\$50
Centrefold spread	\$525	Full page	\$275
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1 column	\$110	1/4 page	\$70
1/6 page	\$50	1/12 page	\$25
Special positions:			
Full page RH side, 1st 20 pages	\$285		
Inside covers, B&W	\$350		

INSERTS

Inserts are subject to prior arrangement. The charge is 1.5 times the full page rate. The inserts may be color and double-sided and may be in foldout or booklet form, but may not exceed A4 size. The required quantity of printed inserts are to be delivered to Significant Bits. Quantity, delivery and other details will be advised on request. Advertisers may contact Ron Lewis (07)273-8946, FAX (07)273-8954.

FROM THE ENGINE ROOM

Last month's meeting went off superbly. My thanks to all who assisted in helping members become accustomed to our new venue. This month should be even better, as members will be more familiar with the surroundings and will be able to direct newcomers to classes, the auditorium, and the refectory.

Don't forget, you must register with the Membership Secretary, before proceeding to classes etc. and **BRING** your **IDENTIFICATION BADGE** with you when you come because if you were issued with a badge last meeting and you forget, it will cost you \$1.00 for a replacement. Come a little earlier and register before the rush! (*Not everyone - Ed*)

MEETING DATES FOR 1993

August 15
September 19
October 24
November 21
December 12

Due to a prior commitment, we are unable to have the October meeting on the 3rd Sunday (17th) so mark your diary for the change of date. The December meeting is also changed from the third Sunday to the second Sunday.

Gold Coast Show

Brisbug will be participating in the Gold Coast Show on the 26, 27 and 28 August. The location of our stand is site 15 in the Big Top Pavilion and a display of Brisbug's activities will be staffed by members residing on the Gold Coast. If you are on the Gold Coast on any of those days, why not visit the Show and say "Hello" to the crew.

Brisbane Expo

The Queensland Computer Expo will be held on September 29, 30, and October 1, 2 at the RNA showgrounds and once again Brisbug will be participating with a display. Graeme Darroch will be organising the display and will be requiring volunteers to "man the stand" over the 4 days.

Lloyd Smith

The Cover

The background design is a fractal produced using FRACTINT V17.2 Design, by Ron Lewis, was done with CorelDraw V4 donated to us by Corel Corp of Canada. Colour separations by Queensland Business Magazines.

The spelling mistake is all my own work!

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MINUTES

Brisbug Meeting - Sunday 18/7/93

"Another opening....another show!"

An amazed (and bewildered) gathering of Brisbug members happened on this historic day in Brisbug History....our first meeting at our new venue -QUT Kelvin Grove Campus.

Time: 1-03 p.m. (of interest to future historians)

Everything was new! The new President, Lloyd Smith, opened the show and then handed the mike over to someone who was once himself President in previous times, Ron Lewis!

New Vice President

First up, a couple of new appointments: Ron Kelly, that master of people-moving, has been appointed as Vice-President, filling the shoes of Lloyd Smith. Rex Ramsay is new to the scene of Brisbug's Management, having been appointed as a Committee Member. This maintains the level of personnel on the "board" to nine (and stops the President from using the dreaded "casting vote").

Vale Victor Kydd

The club had received sad news earlier that morning, when we were advised that Victor Kidd, of the Accounting SIG, had passed away. Ron expressed the deep sorrow of all Brisbug Members at the news and the club sends its condolences to Victor's family. He will be sorely missed.

Report time.

Bob Gurney was first off the rank, giving some news on the Genealogy SIG's plans for the near future. (I'm sure details will appear in the magazine somewhere....Secretary - SIG Report -Ed)

Suddenly Max Kunzelmann appeared to give a Treasurer's Report (there was delayed applause, for some reason.....let's cheer Max up next month a resounding standing ovation!) After the personnel on stage issued the warning "Don't touch the knobs!", Max delivered his "state of the

nation" figures:

Starting Balance	\$11,703-00
Deposits	\$ 9,052-00
Expenses	\$11,634
Closing Balance	\$ 9,120-00

- No questions!

Dan Bridges then conducted one of his famous (but impromptu) surveys to ascertain the number of persons using DOS6. It appeared that of those present 75% had converted to the upgrade. Apparently there is a fix coming out for problems being encountered by "DoubleSpace". (Reversion back to "SingleSpace"? - Secretary)

Ron Kelly (our new Vice-President) walked demurely onto the stage (no Fred Astaire this month!) to give his Educational Report (which was just that!) After informing everyone were all the classes are being held, Ron expressed his thanks to all the personnel who helped make the transition to the new venue a relatively painless one:

Jan Ausburn (Membership Secretary) and her "team" - for their tireless work at the "enrollments" desk and in preparing the numerous badges now affixed to everyone's chest.

Lloyd Smith for masterful oversee ing of the whole affair.

Graham Darroch and Ron Lewis for their patience.

Much applause issued from the throng, and Ron Lewis then passed the club's wholehearted appreciation to the great job performed by Ron Kelly in getting us all to the new venue safely (and what a venue!).

Paul Marwick then appeared from nowhere (as Sysops are wont to do!) and delivered a BBS report. A new Beta version of the BBS software will be installed on lines 3 and 4 shortly....if you find any "bugs" please leave a message to Paul on the board so he can follow-up the problem with the suppliers of the software. Lines 1 and 2 will be "down" shortly (for about half a day) while a new version of OS/2 is installed on the system. The Brisbug BBS will be then totalling running under *that* operating system ("isn't OS/2 wonderful??")

The PC Expo

Graham Darroch then took the stage and gave us some news on the approaching PC Expo. (You know, the "Computer Show" we have each year at the show-grounds!) It is being held during the period Wed. 29/9/93 to Sat. 2/10/93 inclusive. (There will be setting up of the stand on Tue 28/9/93). If anyone is interested in manning (or should that be "personning"?!) the stand during that time (even if only for 2 hours!) please contact Graham.

Gold Coast Expo

The Gold Coast SIG is also having a stand at the Gold Coast Show running between 26/8/93 and 28/8/93 inclusive. They are looking for volunteers too, so again please contact them if interested (you could do that via Graham Darroch as well!)

Graham also passed on the news that Karl Planting has stepped down as Gold Coast President, having shifted house to Brisbane.

Baggers wanted

There is still room on the "bagging committee" - the only prerequisites are that you must like to gossip and must like pizza (in that order). Those who have the qualifications can apply direct to the Editor (Ron Lewis)

The Gladstone visit

Lloyd Smith and Ron Lewis are both again making a pilgrimage north to Mecca (aka Gladstone) on 7th-8th August to visit our Gladstonian brothers and sisters. Anyone interested in joining the holy quest please contact either Ron or Lloyd. (BYO Camel)

Intel presents

A question and answer time followed and then the microphone was handed back to Graham Darroch (the club's official MC) to introduce the guest speaker of the day - Mr Geoff Healy, Managing Director of Intel Australia. Mr Healy spoke about the soon to be released "Pentium" chip (alias "80586"). It was Geoff's second visit to the club (he seemed very impressed with our new facilities) and his presentation kept everyone glued to their seats.

Until next month.....Keep on Brisbugging!

FROM THE NEW ASSISTANT STOKER IN THE ENGINE ROOM

Many thanks for your audible confirmation of committee's decision to appoint me to the position of vice-President, which became vacant when Ron decided to hand over the 'reins' to Lloyd.

I have known both Ron and Lloyd for the past few years and my respect and appreciation continues to grow for these two Brisbug stalwarts, who have given and continue to give their energies and huge amounts of their personal and business time to ensure a successful Brisbug operation..

I have received many accolades for co-ordinating a successful move from Bardon to QUT Kelvin Grove and for these I thank you ... but I think it important to highlight some detail that went into this 'move'..

When it became evident that Council/Government would not relent on the decision to close Bardon, Ron and Lloyd investigated — first by phone then by visiting the various possible venues — with an aim to determine the most suitable future meeting place for Brisbug..

Having determined a short list, they presented their recommendation, that QUT Kelvin Grove be the 'future venue', to Brisbug June Committee Meeting which was confirmed..Now up to this stage all the, considerable leg work was done by Lloyd/Ron.

It is past history now that June Committee Meeting appointed me to co-ordinate the move, and very 'politely' determined that Brisbug July General Meeting would be held at the new residence 'Kelvin Grove'... less than six (6) weeks away and only twelve (12) days to our June General Meeting, the last Brisbug/Bardon general meeting and the time to get the initial message... July/Brisbug/Kelvin Grove...across.

In true form I immediately started passing the proverbial 'Buck', nominating the Jan/Lloyd team to put in place and operate our new Registration Structure.... the Graeme/Ron team to ensure Kelvin Groves Auditorium would be functional by the July opening, bearing in mind that

electronics and audios were still very much in a state of 'assembling' (I dwelt on that word 'assembling' for a while. Maybe Graeme/Ron would have used a different word...perhaps more descriptive). There were a number of other members who early helped to ensure the success of our QUT opening meeting, these included other members of committee also Terry/Software Library and Brian/Library Shop..

In addition, Ron printed all the notices and of course in his spare time produced the July copy of Sig.Bits.- Lloyd was in constant communication with QUT management..I think most members are aware that we moved into two (2) totally new buildings ..(Auditorium and Class Room Block). These buildings were being 'made ready' for QUT's 2nd.semester, finishing off the electrics and furniture of a new building requires constant monitoring.. This was Lloyd's task..and of course in his spare time he produced a host of new library disks and not forgetting his 'Presidential' duties...

So you see, like a good manager I was able to sit back, put my feet on the table, and watch the workers put it all in place..

Ron Kelly

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News from Associated Clubs

CAIRNS PC USER GROUP

OUT-GOING PRESIDENT'S REPORT (1992-93)

John Brennan

Recent news reports advise that Intel have produced a new microprocessor chip (called the "Pentium") which will make the 486 as redundant as the 8088 chip became when the AT model was produced. Further good news is that computers incorporating the Pentium will not be excessively expensive. The big problem is that software will have to be written to take advantage of it...

Of more relevant importance to us (as more of a "hacker" group), is that Advanced Micro Devices of California have been cleared by the courts to produce clones of the 80486 chips, thus bringing these faster computers to a price range more within our reach.

A new meeting place

At this time last year we were hoping that the forthcoming year would result in our relocation to a more central venue. I am very happy to note that, thanks in no small part to the efforts of John Hampson and the Cairns College of T.A.F.E., this has been achieved.

We are very fortunate indeed to have these facilities available to us at zero cost, thus allowing us to keep our annual fees at a nominal figure.

The projection facilities in this theatre have allowed us to view demonstrations of some of the latest software, and of other programs in which we have been seeking further knowledge.

Perhaps we don't have the roomful of computers we were hoping for, but if you can all help in building up our numbers sufficiently, we may, in time, arrive at an economical figure which will allow us to hire one of the computer rooms....

I would like to thank those members of our original group who have supported me over the past two years, especially Dave Hamilton (our Treasurer), Bill Armbrust (Secretary for many years), Gordon McGowan (Secretary at the beginning of this year, but his work put greater demands on him, and our switch to the second Tuesday of the month from the first Tuesday clashed with his better half's meeting night), and, of course, Alex Biggs (our distinguished Vice-President, who has moved to the Sydney environment). For two years, up until we moved our headquarters to the TAFE, Alex travelled up to every meeting from Bramston Beach together with an XT-PC which we used to copy shareware and demonstrate small programs. When Gordon McGowan was unable to continue as secretary, Max Baker took on this (to many) un-glamorous task. I thank him also for the effort he put in, and am sorry he was not present when I formally apologised for a remission in my responsibilities.

I owe a special vote of thanks to John Hampson (our present secretary), who, from the time I approached him apropos the re-location of our meetings to the TAFE College, has been most enthusiastic with his support and cooperation. As a consequence, we have been able to relocate without cost or rental (so far). He has been putting in a lot of time for the group, particularly on our meeting nights, setting up equipment and organising programs for demonstration. He has most capably demonstrated a wide variety of programs and Windows applications to us. Microsoft should show their appreciation to him....

He has also agreed to approach the College Library regarding becoming a corporate member of BRISBUG, thus saving our group that expense, and still allowing our members the right to access to the wide range of programs maintained by the large Brisbane User Group.

The FNQ News BBS

I would like to offer a special vote of thanks to Noel Roberts of 4CA, who took time out from his busy schedule to come along to one of our recent meetings and demonstrate the application of the modem as a means of data communications. His Bulletin Board Service (Far Northern News) in Cairns is most efficiently operated. Since Noel's talk, some of our members have been encouraged to utilise more aspects of the features of the BBS, and have been passing messages to other members and areas via this medium. For instance, a message which John Hampson left for me (in the Pascal Programmers message area) is even now zipping it's way around the world looking for a John Brennan. I have yet to receive it, I might add...

Don't be at all surprised to find that the BBS bug has bitten John Hampson. As a computer sciences teacher, he is aware that his students are going to require a knowledge of data communication skills, and a BBS within the College could provide practice in those skills, without overloading the Far Northern BBS.

A new name

The constitution which has guided us since our inception has served us well, however a possible change of name from THE CAIRNS AND DISTRICT MICRO-COMPUTER USER GROUP might be timely..... Perhaps you would be more at ease with a more universal name such as THE CAIRNS PC USER GROUP?

Apart from a possible change of name, to suit our current outlook, a few slight modifications to the wording of the constitution have been suggested in the new paper you received, for your consideration and possible adoption. I have received some feedback which has prompted me to add a few more amendments. I'll reveal these later....

To the new President

To my successor, I wish every success in his efforts to expand the group. All he will need is enthusiasm, organisational support

and every bit of publicity and promotion he can enlist. I see no reason why our meetings should not expand to an average of 50 members over the next two years. At the AGM last year we had 8 members if I recall correctly. Just look at the percentage increase we have achieved.....

Finally I would like to thank all of you for the way you have cooperated with me. I have found this a most rewarding experience

POSTSCRIPT

Graham Walker was elected President, and a new Vice-President, Secretary, Treasurer and committee were elected as advised separately, and modifications to the constitution, including the official change of name to The Cairns PC User Group was passed.

The Club resolved to participate in any Exhibition of computer and associated software which may be held in the future in Cairns, possibly concurrently with our sister Club in Innisfail.

members on our library hard disk, and will be accessible to general College students on one of the Library computers.

At some time during the coming year, we may be fortunate enough to have, as a guest speaker, Noel Roberts, Manager of 4CA - a Broadcast Radio Station in Cairns, who operates, as a hobby, a BBS, of which you may have heard. He maintains about half a gigabyte of recent shareware programs, which is accessible to all of FNQ club members who have at least a 2400 baud modem, who wish to log on to the board.

Noel took time out from his busy schedule to come along to a recent Cairns Group meeting and demonstrated the application of the modem as a means of data communication. His Bulletin Board Service (Far Northern News) in Cairns is most efficiently operated. Since Noel's talk, some of the Cairns members have been encouraged to utilise more aspects of the features of the BBS, and have been passing messages to other members and areas via this medium, and it is hoped that an introduction to a BBS will encourage our Innisfail members.

The constitution which has guided us since our inception has served us well, however a few minor changes which were instigated at the Cairns Group meeting, to their constitution, might be worth consideration and possible incorporating in our own version which is, as you know, almost identical.

INNISFAIL PC USER GROUP

PRESIDENT John Brennan
10 Tulip St. INNISFAIL
(Ph.070 613 286)

VICE-PRESIDENT Hugh Pittman
c/- T.A.F.E. College

SECRETARY: Lyndell Coianiz
10 Stanwell St. BABINDA
(Ph.070 671 301)

TREASURER: Donna Barletta
P.O.Box 523, INNISFAIL
(Ph.070 612 014)

PRESIDENT'S REPORT (1992-93)

John Brennan

At our inaugural meeting on August 18th, 1992, we had high hopes of becoming the premier computer club of Innisfail. Since we appear to be the ONLY computer club in Innisfail, It would appear that we have achieved at least that. In fact, although we have lost some members due to various reasons, those members we presently have are keen and will see this group expand, not only it's membership, but it's horizons.

Committeeman and TAFE Liaison Officer, Hugh Pittman, has been prompting the

idea of a computer exhibition. Perhaps this may become a reality within the next year of the club. Our sister Club, Cairns, are interested in the concept also, so perhaps we may be able to organise something co-jointly.

We are unfortunate to have lost the presence of Alex Biggs, retired rocket scientist and our inaugural Vice President, who has moved to Sydney. A new V-P will be formally elected in his place this evening.

We are very grateful indeed to the Johnstone College of T.A.F.E. to have these facilities available to us at zero rental. This allows us to keep our annual fees at a nominal figure.

The projection unit has allowed us to view a couple of programs, and it is hoped to make further use of this facility to demonstrate various Shareware utilities and other programs in which members have been seeking further knowledge.

We have been successful in gaining the support of the College Library which has as from January, become a corporate member of BRISBUG, thus saving our group that expense. This means that College students may now borrow copies of the SIGNIFICANT BITS (BRISBUG) magazine to read. (The catalogue of Shareware programs available is accessible to our

POSTSCRIPT

Proposed changes to our constitution were subsequently adopted including the alteration to our financial year to Jan 1 - Dec 31st.

Hugh Pittman was installed as our new Vice President and it was resolved that the Club would participate in a Computer Exhibition to be arranged in conjunction with local business and media interests.

A meeting will be held at the TULLY Campus of TAFE on September 7th, to bring to local users, the activities of our group. Innisfail members will travel by coach departing from the Innisfail TAFE at 1830 hrs.

ASSOCIATED CLUBS DIRECTORY

Club Name	Centred in	Telephone	Contact
Coffs Harbour Computer User Group	COFFS HARBOUR	066-538283	Janell Rose
Gold Coast SIG (of Brisbug)	BURLEIGH WATERS	075-930577	Carl Planting
Dalby PC Users Group	DALBY	076-621381	Peter Allen
Beaudesert Computer Club	BEAUDESERT	075-411050	Bernie Williams
Pine Rivers IBM Compatibles C C	STRATHPINE	881 1452	B Schultz
Sunshine Coast Computer Users Group	MOOLOOLABA	074-442711	Daz Picton
Landsborough Computer Club	LANDSBOROUGH	074-923205	
Noosa Hinterland PC User Group	COOROY	074-852052	Colin Sheehan
Kenilworth Computer Users Group	KENILWORTH	074-460328	Peter Webb
Cooloola District Computer Club	GYMPIE	074-833881	Dorothy Ross
Fraser Coast Computer Club	HERVEY BAY	071-212394	Steve Bottom
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Gladstone Computer Users Group	GLADSTONE	079-783941	Cec Wilmott
Rockhampton Group	ROCKHAMPTON	079-312383	Nick Quigley
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Brisbug congratulates Graham and his team on their election and looks forward to working with them to our mutual benefit.

Graham, an long-time member of Brisbug is a refugee from the southern cold (of Brisbane) who is obviously enjoying the tropics

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The OS/2 Column

August 1993

with Paul Marwick

New in Version 2.1

First I'd like to cover some aspects of the new release of OS/2. Version 2.1 has been out for a little while now, and adds significant capabilities to the already excellent capabilities provided by OS/2 2.0.

Windows compatibility

Much of the publicity for version 2.1 has concentrated on its enhanced abilities with regards to running Windows programs. Not only does it provide the ability to run Windows 3.1 programs (which did not exist in version 2.0, since it was released before the release of Windows 3.1), it also provides the ability to run Windows programs in enhanced mode. In addition, it now runs Windows programs substantially faster than it did in version 2.0.

Speed

While these abilities are certainly useful, I'm more impressed by a number of other, much less advertised enhancements. OS/2 2.1 is substantially faster in operation than 2.0 was (to give an example of this, installing 2.1 on the machine which runs Lines 1 and 2 has, with no other changes, shaved almost two minutes off the time taken to perform midnight maintenance), and has also improved overall system stability substantially. It adds a support for a number of new hardware items (much more extensive CD-ROM support is provided, as well as better support for high resolution video cards and a wider range of SCSI adaptors).

MultiMedia extensions

Version 2.1 also comes with multi-media extensions. I've installed these for several people, and they seem to work well. Personally, I think that the various sound effects that can be associated with opening and closing folders, dragging objects and various other operations would drive me to distraction in a matter of hours, but they are there for those that want them.

2.1 is available in a number of different formats. 3.5 inch diskette is probably the most popular, but 5.25 inch diskette is also still available (I wouldn't like to count on that continuing for the next version, judging by the length of time it took to get stock of 5.25 inch diskette copies). In addition, 2.1 is now available on CD-ROM. It's obvious that IBM would like to encourage CD-ROM distribution - the price for the CD version is a fair bit less than the price for the diskette version. Given the size of the operating system, and the amount of time it takes to install, being able to install from CD would obviously be beneficial to end users as well. I'm hoping that by the time the next version is released, I'll have an OS/2 supported CD-ROM for my own use, which should make life easier.

Hard-copy Manuals

A frequently voiced complaint about version 2.0 was that the manuals provided with it were inadequate. It was supposedly possible to purchase full manuals, but I never saw any of them. IBM has taken steps to address this criticism with the release of 2.1 - it comes complete with an excellent (and substantial) set of manuals.

*" OS/2 is now
available on CD-ROM
... at a lower price than
the diskette version "*

Judging by the number of copies that we have already sold, OS/2 is gaining in popularity rapidly. I was getting ready to be very nasty to our suppliers for messing up our order and sending us far more copies than we had ordered, but it looks as

though the extras will all be sold before I get time to do so. Certainly, the level of interest in OS/2 has grown a great deal since 2.1 was released. Helped no doubt by the arrival of a number of new software packages for OS/2.

Stacker for OS/2

The first of these is Stacker. After a great deal of delay, Stacker for OS/2 and DOS is finally available. While I haven't yet got very extensive experience of it, it seems to work well, and with negligible overhead. The first version is limited to use on FAT partitions (which will be addressed in the next version), but provides all the benefits that Stacker for DOS provides. It has the added advantage of being compatible with the DOS version, so that stacked drives can be used either under OS/2 or under DOS.

WordPerfect for OS/2 soon

There are a number of other software packages for OS/2 either just released or due very shortly. WordPerfect 5.2 for OS/2 should be available before the end of the month. Ami-PRO for OS/2 is also scheduled for release in the very near future. All we need now is for some of the Australian distributors to wake up to the fact that there is a demand for OS/2 software and start supplying it.

Hopefully the availability of OS/2 software will improve as the distributors become aware of the demand for it. No matter how good an operating system is, without software for it, it's of little use to anyone...

Why no networking capabilities?

One major disappointment (at least to me) with the release of 2.1 was that it does not yet include inbuilt networking capabilities. OS/2's abilities lend themselves very well to networked operations, and there so far, is a complete lack of a small peer-to-peer network for OS/2. I had very much

hoped that something similar to Workgroups for Windows would be released with OS/2 2.1. This disappointment has been somewhat alleviated by the announcement of "Peer OS/2", which is a small peer-to-peer network being developed by IBM. Artisoft are also supposed to be developing a version of LANtastic for OS/2, though no release dates have been mentioned so far.

At the moment, the only network solutions available for OS/2 are aimed at large

networks. Novell has a number of network products available for OS/2, and there is also IBM's own LAN Server/Requestor package. However, for small networks, there is nothing yet available.

UNIX connectivity

As well as conventional networking products, IBM has a TCP/IP package available for OS/2. This provides connectivity to Unix networks, including the normal

Telnet facilities and an X-Windows server, plus NFS servers and clients. Overall, a very good package for anyone needing to connect to Unix based networks. I have experimented with using the NFS implementation to provide simple peer-to-peer services between OS/2 workstations, and found it functional, though I also found the overheads involved in what is essentially a translation layer for foreign file systems too high to make this an attractive approach for a small network.

BBS News

August 1993.

The betacopy of Maximus 3, mentioned in last month's new is now running on lines 3 and 4. It has a few behavioral peculiarities, but has generally been performing fairly well.

Observed problems so far. File tagging when doing a new files scan on first logging on works only intermittently if at all. In some instances, file tagging has been seen to fail from within the file areas.

There have been some reports of video problems with the headers displayed in the file areas, the message areas and the change menu. These seem to be confined to those using AVATAR graphics.

There is a problem with commands which normally accept the enter key, such as displaying the next message. This seems only to be affecting people using command stacking mode - those using hot-keys will not experience this problem.

In the same setup, some spurious echoed characters will be seen - after a command is entered, you may see it echoed on the line below. Again, this seems only to be affecting people using command stacking.

There were some early problems with tagged message areas. So far as I have seen, they were a short term effect of the changes made to the method of tagging message areas, and should now be cleared up.

Given the general stability of the software, it will probably be installed on lines 1 and 2 within the next few weeks. By the time

I have time to do so, the next beta may have arrived.

While I'm not currently able to discuss the changes made in the new version (and it would probably be unwise to do so anyway, given how early a beta this is), there are a number of changes visible to callers.

First, there are several new file transfer protocols available. Ymodem (true batch Ymodem) is now available, as also is Ymodem-G.

You should note that Ymodem-G is only effective if you are using an error-correcting modem, since that protocol has no error correction built in. If you have an MNP or V42 capable modem and clean lines, it will give good results. If not, you will be unlikely to be able to

Bug fixes

So far, there have been two fixes released for OS/2 2.1. One is intended to fix a problem on some systems with the desktop coming up blank, as well as with a cosmetic problem involving shut-down. The second was to fix an incompatibility between FDISK in 2.1 and earlier versions.

download using it. Under most circumstances, Zmdoem remains a much better option.

A number of changes have been made to the QWK mail system. The most visible of these is a new menu option, which allows a caller to restrict the packing of mail by specifying a cut-off date for mail. This should be useful for people trying to read large echo areas, as it will allow the user to restrict the number of messages packed.

There have been a few problems with message areas, in particular, a few areas suffering damage due to a system lockup. In a couple of those areas, the damage has seemed to be recurring. I may have to delete the areas to clear the problem completely.

LOST AND FOUND

Left in the LIBRARY last meeting:

Ladies pink-framed sun-glasses

Brown cardigan

Would the shivering lady with the squint please collect these items from Terry or staff

THANKS TO

Corel Corp
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for the donation of a copy of

CorelDRAW
V4

used to produce the cover of
"Significant Bits"

COMPUTERS, RADIO AND RALLYING

Brian J Mennis

The Queensland round of the Australian Rally Championships took place over the weekend of 26th. and 27th. June, mainly in the Gympie/Imbil area, but with sections at Toombul and Beerburum. There were 17 competitive stages in total over two days, and 49 cars started in Brisbane. This event was notable for the successful use of computers, connected by amateur radio, to take scores from the control point at a flying finish and then to automatically update the scoring data base, which was located in the Mayfair Crest Hotel in Brisbane.



A rally car comes into the checkpoint in the background as Jonathon Sands sends a score from a previous car to Brisbane

So successful was the operation that the scoring data base was being updated for some stages within one minute of a car arriving at a flying finish control "in the bush", with an average overall of less than three minutes.

The whole operation in the field was carried out by members of the Wireless Institute Civil Emergency Network, WICEN, a group of Amateur Radio Operators whose purpose in life is to assist with communications in disaster situations. As these are thankfully few and far between, WICEN assists in communications for various sporting events, such as Car Rallies, to maintain readiness.

Data by packet radio

The system used to transmit the scores was an Amateur Radio Packet Radio Network. Packet Radio is very similar to a telephone network using telephone modems, but because the tones that can be transmitted are different to those used on the telephone lines, different modems are used. However, as the maximum baud rate that can be used by standard radio equipment is 1200, it is somewhat slower than normal telephone networks. The "Packet" in the description comes from the method of assembling each packet, which can be a maximum of 255 characters long. In effect, the system is the same as the commercial X25 standard, with the addition of radio callsign identification information to make the transmitted packet comply with the laws that regulate radio communication. It is then known as AX25, or the Amateur X25 protocol.

As all the control points were in the field with no mains power available, all of the

equipment, radios, modems, computers etc. was dependent on batteries to keep the station in operation. All control point operators used laptops of various ages and vintages, and all operated successfully in the dusty environment.

Because the frequencies being used in this operation, 144.7mhz and 433.8mhz, are essentially line of sight, (not quite correct, but near enough for this article), it was necessary to set up two digital repeaters, or digipeaters, at Maleny, at the residence of Guy Minter, an excellent high site midway between the WICEN field base at Mt. Borumba and Brisbane.

Having given some of the amateur radio background, I now must give some of rally background, and explain these terms that I am using, "competitive stage", "flying finish", etc. The course for a car rally is broken up into a number of "legs", which do not concern us. Each leg is broken up into "stages" and within each stage, there are competitive and liaison stages. The part that generates the most interest is the

competitive stage, where the car that records the fastest times in total over all competitive stages is the winner. That is a little simplistic, but for the readers of SIGNIFICANT BITS, it is close enough. Each car is started at a pre-set time that is recorded on the drivers road card. At the flying finish, the finish time is recorded and transferred to the driver's card and the elapsed time is calculated. The score is the elapsed time for the stage. It was the function of WICEN to get that score from the flying finish back to base as quickly as possible.

In actual fact, to ensure data integrity, the start and finish times were transmitted as well as the elapsed time, along with some message identifying information.

In the past, WICEN has used voice, and written messages were handed to the scorers at base to produce the various scores and reports. Actual scoring was carried out on a variety of spread sheet and data base programs, with, at one time, a specially written program in QuickBasic.

The switch to packet radio

With more and more amateurs using packet, this seemed to be an ideal method of sending scores to base. In the 1987 and 1989 Rallies, the Queensland Digital Group assisted in transferring scores from sub-bases to the scoring base by packet, as very few members of WICEN had packet capability at that time. In the 1988 event, plans were made for a major packet effort by the Queensland Digital Group, but these fell through along with the rest of the event when it was cancelled in the week before it was scheduled to start. In all of these events, there was no thought of trying to update the scoring data base using the packet digital data, rather the printed scores were manually re-entered into the data base by the scoring team.

Packet operations then remained dormant until 1991. In that year's event, with more WICEN members having packet equipment, Brisbane WICEN tried using this mode, with a transfer to the scorers by disk. This was a complete disaster, which was caused mainly by unsuitable software, both from WICEN and the scorers. This was not helped a poor link on the single packet frequency we were using. At an "after the event" post mortem, it was concluded that we would

do far better if scores were sent one at a time, instead of 10 at a time as we had tried, and to arrange for more and better data links.

Developing the software

As a result of this meeting, and because no suitable "off the shelf" software was available, I wrote two programs, RFORM and RSCORE. The former is designed to be used at a check point in the field, and the latter to be used in base. Each is fully self-contained, and has its own packet termi-

"One of the frustrations we've had over the years is the changing of scoring methods ..."

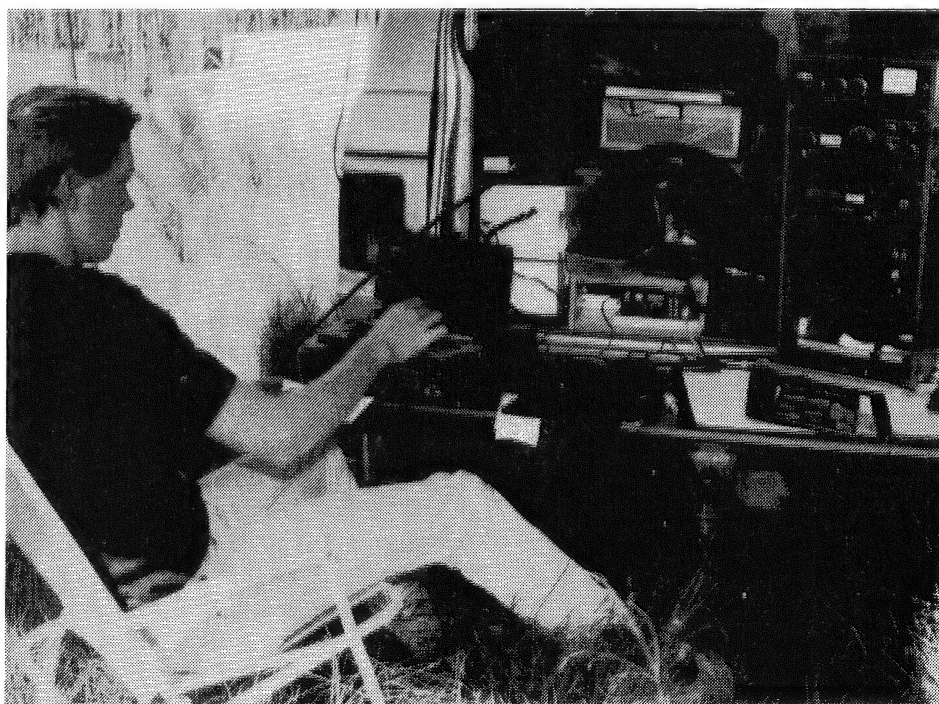
nal interface. These were started off in QuickC, but later I changed over to Borland C++ version 3 and later to version 3.1. The change was made mainly because of the easy availability of source code for the

terminal functions necessary to interface to the packet modems.

Last year, the Brisbane Sporting Car Club did not advise us of their requirements until rather late in the year, and packet did not play a large role, although it was used to a certain extent. Where it was used, it was obvious that scores could be transferred to base very efficiently, even though, at that Rally, we were merely handing printed scores to the scorers to manually enter as in earlier years.

RFORM and RSCORE had not been completed at the time of the 1992 Rally, and did not get used. First operational use of these programs came early this year when they were used by Victorian WICEN in the Healsville Stages, which is the Victorian Round of the Australian Rally Championships. All that happened here was that the radio operators handed a disk of received scores to the car club scorers, who imported the data into their scoring program.

One of the frustrations that we had over the years was the continual changing of the Car Club's scoring method, and, following last year's event, it was suggested to the Car Club that they set up a committee to come up with a standard method of scoring, and we would help them with the interface to WICEN and packet. This did not eventuate until March, when they "found" Mike Geldens, a



Jonathon Sands sends score to the Mayfair Crest, using a laptop connected to the radio which is immediately behind the computer. The other radios to the right were used for voice liaison purposes

professional WINDOWS programmer, who also had extensive experience on databases. When we had our first meeting, he stated that it would be ideal if we could enter the data in the field, and then use the entered data to automatically update the data base. He was surprised to learn that such a system was possible, provided he could set up the links necessary from the packet system into the scoring data base. This he proceeded to do, although not without some problems. After some consideration, Mike decided that he would score on Microsoft Access, using Microsoft SQL Server running on a Lan Manager network.

Connecting to the network

The base packet software was originally intended to be RSCORE Version 2, but problems arose when we tried to connect it to the network and SQL Server. To make a direct connection, it was necessary to link several SQL Server functions into RSCORE. As mentioned earlier, RSCORE was originally compiled using Borland C++ Version 3.1, and as SQL Server is a Microsoft product, compatibility problems were found, and in the end, Borland advised that this was not possible. The solution was found in an unrelated suggestion made earlier by an active member of WICEN, Bill McDermott.

Two-channel "Windows"

As we wanted to have two radio channels into base, on 144.7mhz and 433.8mhz, Bill suggested running RSCORE (a DOS program) in two windows on Microsoft WINDOWS. This was found to work quite successfully in tests. When RSCORE was sidelined as the base program, we found the source code for a very basic WINDOWS terminal program and this was modified by Mike Geldens, with some assistance on the packet functions from myself. (Again my Borland compiler would not compile in the necessary SQL Server functions). The program that was produced was very basic, but would receive a score message, and send it down the network into SQL Server to be processed by Microsoft Access, automatically updating the data base.

The software used in the field was RFORM Version 2, and reports from the field indicated that it worked successfully. However, there were several suggestions for

modifications, and these will be worked on before the next event.

As noted earlier, the main scoring base was on the 3rd. floor at the Mayfair Crest Hotel in Brisbane. Because of the length of cable that would have been necessary to go from the antennas on the roof to the 3rd floor, resulting in too much loss of signal,

*"After some
consideration,
Mike
decided to
score on
Microsoft
Access"*

it was not possible to locate the radio base in the same suite. Instead, a room was made available on the 15th floor, directly over the scoring suite. A length of RG58 coaxial cable (thin coax) was run from the 3rd floor to the 15th floor outside the building to connect the computer used for packet reception with the scoring network.

To further assist in getting scores to base, another active WICEN member, and also a communications engineer, Graham Long, suggested that we should not have stations in the Gympie area connected to base through two digipeaters as this could give rise to many collision situations. His solution was to take scores into his computer on 144.7mhz and retransmit them on 433.8mhz. His software, RRELAY, which worked perfectly during the Rally, was based on an amateur radio variant of the TCP/IP protocols. Graham set up his system at Mt. Borumba, where the main WICEN field base was established, and at one stage had 5 packet stations sending scores to him on 144.7mhz, and very successfully re-routing these to Brisbane on 433.8mhz, with only the one intermediate digipeater at Maleny.

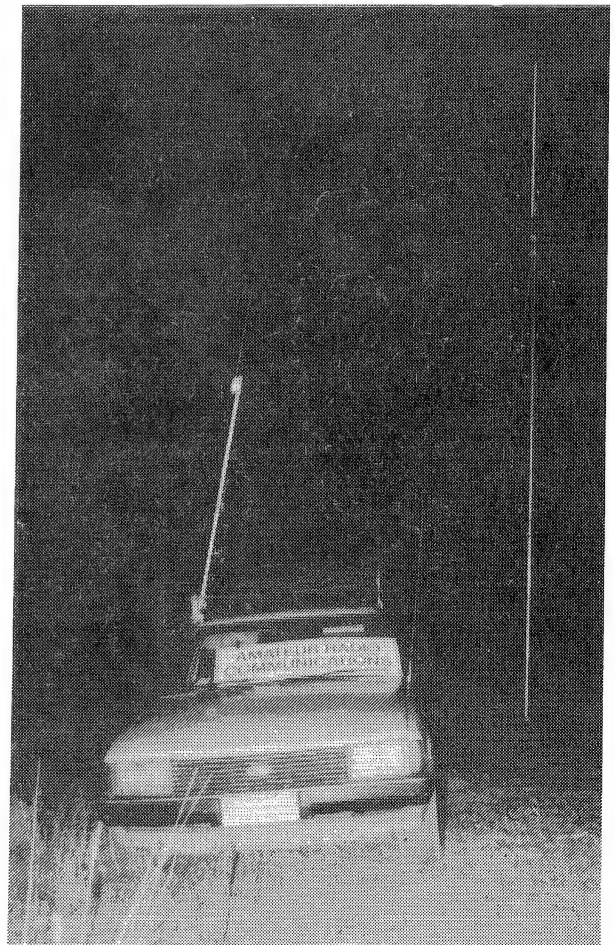
So "bullet proof" was this system, that, when base lost power in the Crest and was off the air for about 10 minutes on Saturday night, no scores were lost, with Graham holding scores received during this period, and transmitting them when base was operational again.

The wash-up

All in all, this event showed that WICEN could put a portable packet network into the field, and operate efficiently, and the experience gained will be of immense benefit if ever WICEN is called upon to operate such a network in an emergency situation.

The Author

Brian has been an amateur radio operator for 29 years, his major interest being emergency communications. His experience includes PNG and Civil Defence operations.



Mobile radio station set up at a checkpoint in the forest near Gympie

SIG Reports

for July 1993

Pascal SIG

Last months Pascal SIG consisted of a variety of topics. One gentleman demonstrated his software that he wrote to simulate a Motorola 68000 chip. This program that was written several years ago, allowed assembly of programs into memory. You could then watch data and code as it flowed through the CPU and in and out of memory. It was very detailed and had many features. This gentleman is now converting the program to use the object-orientated Turbo Vision framework. The group also discussed graphics programming and a variety of other programming problems. Next month we will be discussing graphic programming in detail and possibly start writing some graphic routines and maybe start writing a game. With some luck John Back may be present to demonstrate his new version of ASM-MATE which he is currently writing while at his co-programmers home in North Queensland.

Brad Turner.

Genealogy Sig

I will try to get this one in for August and see if the editors can find it. *(There are roughly 10000 files on Brisbug's board. I can only find files left in the correct areas ... ie area 1 or "Stack" -Ed)*

Last month I wrote telling you about the coming visit the Mormon Family History Centre at Kangaroo Point, and even though it did not appear in the magazine we still had a large turnout and I think all had a go at the program on the computer, and some even found some information on it that they had been looking for. I am also told that a lot also then booked more time at a later date now they know how to use the program.

If you are looking for information on the Mt Cootha (Toowong) Cemetery I am told that there is a book in the local Council Library located at Coronation Drive near the Regatta Hotel, and that is not a hint if you cannot find the information.

PLEASE NOTE

If you have a modem, then use it on line 1 and 2 of our Bulletin Board, in particular Area 55. It is called Genealogy and there are a lot of good programs there and information - that is if you are interested in the UK. Also have a look in Area 39 of the message section to get a UK connection. Yes, we can now get information to and from UK and other places for the cost of a local phone call. Surely this must be worth something to us, so let's use it.

No trips are planned for August as I am sure that I will be too tired from the ECKKA. After all having 10 days to see it all and have fun wouldn't you be tired? But this does not mean that I cannot still be contacted when required, if you are willing to pay for the call then I am willing to help, particularly if you are trying to get the information from your ged file into your data base. It can be tricky, so backup your data first, i.e. before trying.

Love the new location at Kelvin Grove the room is so big and light now all I have to do is find some videos, perhaps "Stories of the Dead"?

Well See you at the new location soon, and if you run into trouble with your search give me a call at a reasonable hour.

Rob Gurney 07-355-4982

Windows SIG

The July meeting saw BrisBug moving into it's new premises for the first time, and most of us had never seen the facilities available for us to use in the SIG. Bernard Speight showed us how to build a typical slide presentation using Microsoft Powerpoint.

For August I will be presenting a "shoot-out" between Microsoft Project and Symantec Timeline. I do a reasonable amount of project planning on computer for one of my clients. Initially we started out on Microsoft Project, and having spent numerous hours building very extensive

Project files, my client's client decided to change their in-house standard to Timeline, requesting us to follow suit. Conversion to the new system was interesting to say the least, but I now have very good experience with both programs, and will show the strengths and weaknesses of both products.

September will see a review of ABC Flowcharter, presented by Peter Troeger from Incitec Ltd. (a friend of Bernard's and a Brisbug corporate member through Incitec).

Between now and the end of the year, future presentations will be done on Foxpro by Peter Akers, and Bernard and I will do a dual presentation of customising Microsoft Excel and Word. The normal Q & A sessions and shareware demonstrations will continue as usual.

Hope to see you at the next meeting,

Brian Bere-Streeter.

STOP PRESS

Gold Coast SIG

I understand Gold Coast SIG are changing their meeting frequency to once per month from its current fortnightly format.

Intending visitors should contact the Secretary of GCSIG, Joanne Ellis on (075) 710 113.

Joanne can also take your details if you wish to help with the stand at the Gold Coast Show

Generic CADD v6.1 from AutoDesk

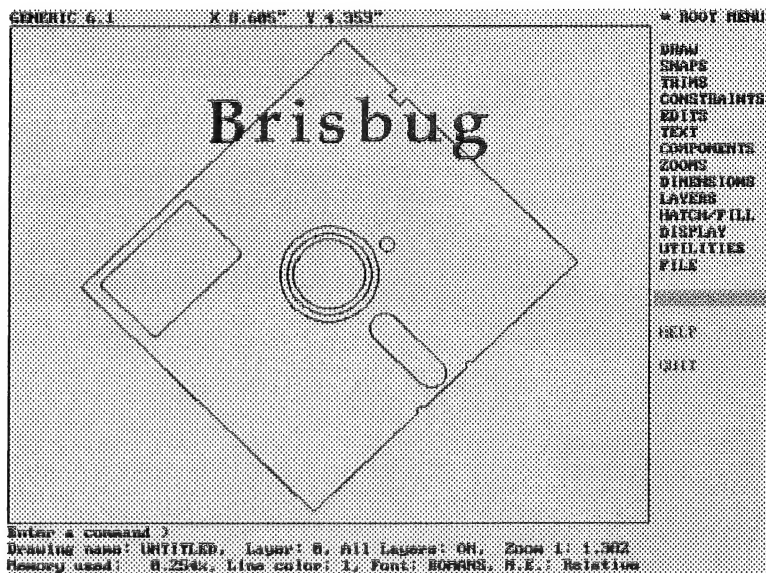
Reviewed By Graeme Darroch

Generic CADD v6.1 is an upgrade to the existing product v6.0. The software is revised to now include a network install option, a new print manager, a new menu that simulates the AutoCAD side menu and a new utility to convert AutoCAD .DWG files for use with Generic CADD and to store drawings that have been created with CADD as AutoCAD .DWG files, fully interchangeable.

When I was asked to review Generic CADD 6.1, it caught me a little off-guard. I have used AutoCAD for several years, and was a system manager (albeit temporarily) on a Unix system running ME10, from HP, on Hewlett-Packard series 300 machines. So having experience of several systems I was eager to see what this lowest of the price range from AutoDesk would do. Never having used the product before I had a lot of preconceived ideas of what to expect.

System Requirements

Minimum IBM PC AT or higher or 100% Compatible - MS-DOS 3.0 or Higher - Hard Drive with 8.0 MB available - Floppy Drive - Graphics Card (Hercules Colour or Mono, CGA, EGA, VGA, 8514a, TIGA, VESA, DGIS and others (minimum EGA for Colour) - Includes (EMS) Expanded Memory Specification, (XMS) Extended - Memory Specification, and Virtual Memory to Disk. Recommended Options. Math Co processor - Microsoft Mouse or 100% compatible, trackball or digitiser. File Formats Supported. AutoCAD .DWG In/Out - .DXF - any Generic CADD .GCD/DWG and 3DD file formats - Export to HPGL, TIFF, PCX, BMP and EPS. Output Devices. 85 Pen Plotters, over 300 printers (including dot matrix, lasers, Postscript, HP500 Series printers in black and white and colour)



Standard CADD6.1 screen displaying a familiar logo

Well, I was in for quite a few surprises!

I operate a system for a living which runs AutoCAD Version 12, on a 486DX33 with 16 MB memory, 400 Meg HD, NEC 4FG MultiSync Monitor, a Summa Graphics Digitiser, and a Matrox Video Co-Processor video card; anyone would agree a reasonable system. At home I operate with a 386DX40 125 MB HD space (105MB DoubleSpaced), 8 MB Memory, SVGA Monitor, 1M Tseng Labs ET 4000 video card. My first preconception was that the program would run, but run slowly, with long redraw times, especially since I do not have a maths co processor, but I was wrong. Generic CADD runs very nicely, with redraws taking not that long, at least not long enough to be a hassle, and general performance being quite acceptable.

The biggest difference that exists between AutoCAD and Generic CADD is that Generic CADD only deals with a 2 dimensional world, while AutoCAD deals in a

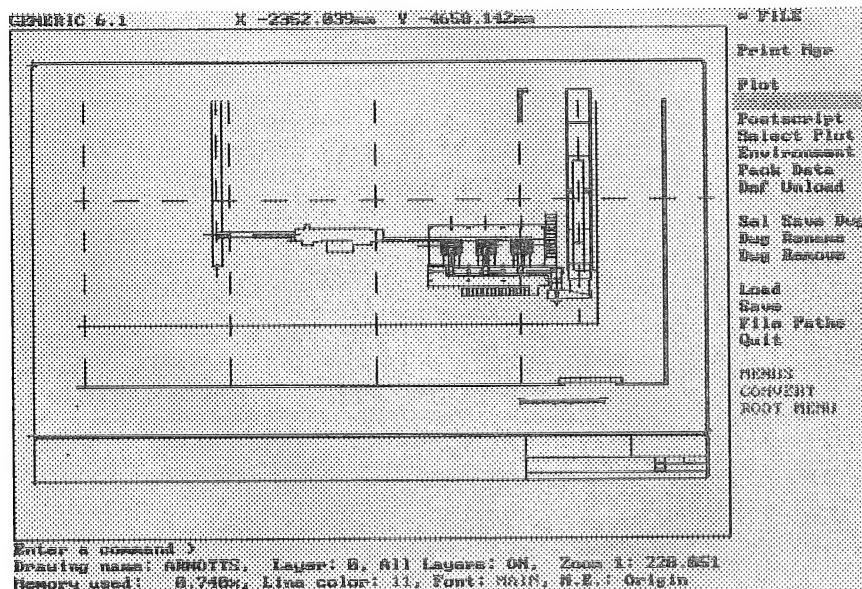
fully 3 dimensional world.

The fact that AutoDesk have provided an AutoCAD compatible menu system makes things a little easier to start with, but I found that I soon went over to Generic CADDs own menu system because it has so much more to offer than AutoCADs menu.

The information provided by AutoDesk in this package is very good. Provided are a Users Guide, Reference Guide, Installation Guide, Customisation Guide and How to use Generic CADD with AutoCAD. In this package you will find everything that is required to get you up and going, it does not try to teach you how to draw, but it does give a Tutorial Guide through the software. A nice touch is the manual specifically for AutoCAD users who are using CADD. This discusses the many similarities, the areas where there are differences, and gives a huge list of AutoCAD commands, and an explanation of the equivalent Generic CADD menu commands, and command line commands.

Installation

Installation was an easy process of following the installation guide, the system will install to a default directory, but you can specify your own directory if you wish. The program as received came on three 3.5" disks which unpack to your chosen directory, make the subdirectories and insert all the required files. I then ran the Configuration program and answered the questions, none difficult, then tried the program which operated faultlessly.



Drawing imported from AutoCAD

To test this new software I thought I would do a job I had been meaning to do for quite a while, draw my house. I had a good start in that I already had a set of builders plans of the house.

Getting started

To start I drew the site. First thing that struck me was there are a lot more keystrokes than there are in AutoCAD. I started out referring a lot to the supplied Command Reference card, but I soon started to remember the basic commands. After a while I started using the side menu to select the main items and the command line to enter the snaps etc. required.

To draw the house itself I used the *RELATIVE* command that allows you to enter points relative to the previous point you entered. The parallel snap was used to draw lines at a set distance from other lines, and the finished lines were trimmed to the correct length or to intersecting lines. By this process the walls etc. were drawn in to the sizes that were detailed on the original drawings.

Part of the installation generates a symbol library which is very extensive, and has symbols of architectural, electronic, engineering and business. It really is quite large and of course can be added to by users to give a custom-made library. Read on for what can be achieved by adding attributes to these components in the libraries.

Once the shell of the house was drawn I called upon the extensive component

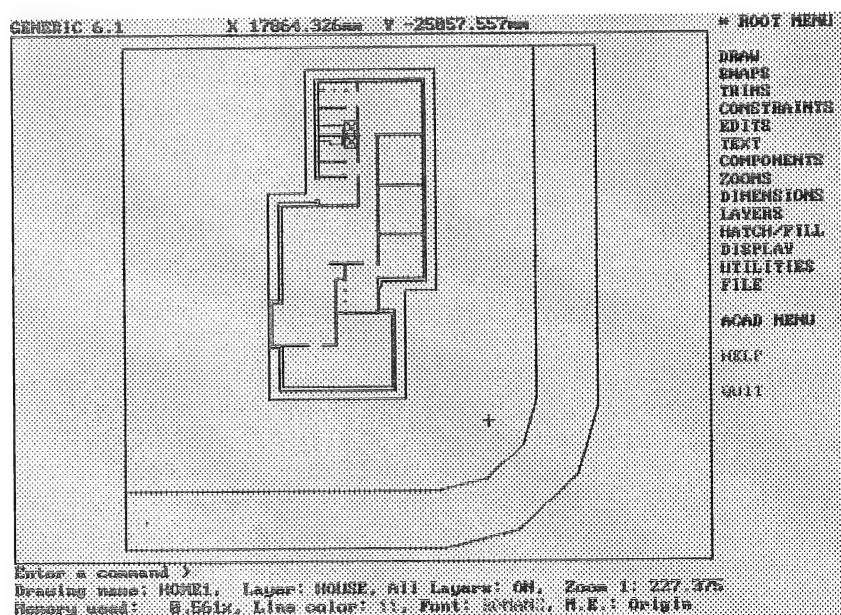
library for the various fittings that make up a house. These are called up from the library, positioned on the drawing and then are available for use again using the same definition at any time. One thing here that is a big improvement over AutoCAD is that you can remove a block (or component) definition at any time using the *REMOVE COMPONENT* command from the menu.

These components can have attributes attached to them, which can be set to whatever you wish, for example, to describe the item, the item number, the cost, the supplier. This can reflect standard stock

components that you have on hand in your business, who supplies it, how much it costs etc. The program itself can then automatically generate a list of items used on this drawing, with how many have been used, and a total cost, which can be included on the drawing, or printed separately. The items can even have how long it takes to fit the item and a total of time required to fit out arrived at. Powerful stuff, not new to Cad programs, but, this program makes the generation of these lists exceedingly easy, with a built-in program for these Bills of Materials. Once again an excellent tutorial and explanation are provided in the users manual, and this should make what can be a difficult system to master very easy.

Several commands are available in Generic CADD that are not available to AutoCAD v12 and while it would be a good exercise to create them in LISP it is excellent that CADD provides them already. One of these is *TRIM INTERSECTION* which will delete all the extra lines from a double line intersection in two keystrokes. There is not an equivalent language to lisp in Generic CADD but there is a very powerful Macro Language with quite serious commands available to the user who has mastered the initial easier commands. A complete section of manual is devoted to a customisation guide, mostly devoted to macros and their commands.

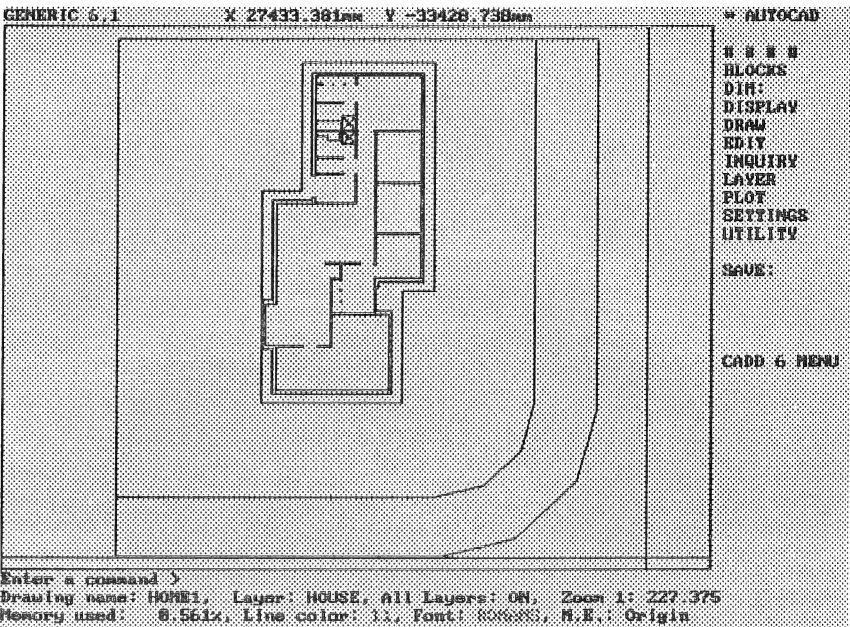
CADD has a similar layer setup to AutoCAD in its earlier releases, you can freeze or hide layers, change the layer that



The house drawing I generated, showing the CADD6 menu

items are on, select items by layer and change items by layer.

I thought that the claims made by AutoDesk about the interchangeability of AutoCAD .DWG files and CADD deserved testing and to do so I brought home some drawings from work. I loaded the file (a proposal drawing) direct from B: and despite taking a little while to do the conversion, loaded no problem. The drawings I use in work are created using paperspace/modelspace setup and this also converted no problem, with the paperspace border coming in at the same scale as the rest of the drawing which was drawn in modelspace. After scaling the border up to suit you could not tell the difference, even the fonts and hatching were transferred with no problem. I then took a drawing created in CADD and stored as a .DWG file into work and again no problems were encountered.



House drawing, this time with the AutoCAD menu

Conclusions

If you have a business which does not have a huge budget, or require a simple easy to use drawing program for your own use, which only uses two dimensional systems, then Generic CADD is the program for you. I would say that a lot of people who use AutoCAD and never get into the three dimensional side of things, have wasted a lot of money, because Generic CADD v6.1 will do everything they ever require for a fraction of the price.

The product is available from all AutoDesk registered dealers price \$695 RRP.. Review copy supplied directly from AutoDesk Richmond Victoria.

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Digital Video in Windows

Patrick Ford

Why video?

In today's world, success demands an ability to gather, assess and present information and ideas. Easy-to-use graphical operating systems and powerful productivity tools that allow personal computer users to manipulate text and graphics fill this need. The addition of video into the digital world further enables businesses and individuals to get the right information at the right time in a form that they can use effectively. Video has the ability to convey more information, more accurately than text, graphics or still pictures alone. It is also a more engaging and exciting way to communicate. Video in a digital format is even more powerful because it can be easily captured, edited and played back on today's computer systems and integrated into a wide variety of applications. The technology to bring digital video to mainstream computing is here today. The Microsoft Video for Windows architecture extends the Microsoft Windows operating system and enables businesses and individuals to play back video clips and incorporate digital video in a wide variety of today's shrink-wrapped applications. In addition, Microsoft Video for Windows allows users to capture and to edit video sequences.

This paper examines:

- * Video as a means of communication
- * The advantages and power of digital video
- * The Microsoft Video for Windows architecture
- * Using the Video for Windows tools to create and to integrate digital video

More Effective Communication

A 1992 study by Market Vision found that 43 percent of the corporate executives surveyed found their business meetings boring, and 40 percent admitted that they fell asleep during business presentations.

The same study found that the most effective presentation aid is video, because it combines moving pictures and sound. According to a 1991 study by Inteco Corp., video presentations can cut a meeting's time by 40 percent and boost retention of information up to 38 percent.

These findings have broad implications for business communications. They suggest that video can be a useful tool for a range of business uses.

Business Communications

Multimedia slide shows, electronic product brochures, video product demonstrations, video e-mail, video reports, memos, and other tools can be used in sales and

duced product demonstrations and customer testimonials for a product brochure.

Education and Interactive Training

Employee orientations, human resources updates, electronic employee newsletters, and safety training courses benefit from interactive, user-directed video. Some of these examples might include formal video—carefully and professionally produced. A video message from the chairman, for example, might be embedded in employee newsletters or orientation sessions. Sophisticated animation might be included in employee health and safety materials to explain complex issues or procedures.

Technical Documentation

For those users who have suffered through hundreds of pages of user manuals, interactive manuals, including video, are a tremendous improvement. Such manuals—an extension of the context-sensitive help already available in the Windows operating system and other software products—can be used in service and repair applications. For example, an airplane mechanic could view a video clip contained in an on-line version on the plane's technical documentation to see and hear how to repair a certain part of the plane.

Information Delivery

Authors, animators, and other creators can use video as another medium to deliver their ideas and information. Video has long served this use, but as it becomes easier to use and more accessible to more authors, it will become an increasingly popular tool. Also, digital video can be easily mixed with text, graphics, and other data types to suit the needs and interests of authors and audiences. Already, college "courseware" takes the place of traditional textbooks in some classes; these interactive software textbooks, which include

*"Full color, full motion
video contains a
tremendous amount of
information; each second
of video can require 27MB
of data."*

marketing applications, staff presentations, corporate communications and advertising. Some of these applications leverage casual video—the type of video that's captured on the fly—during customer research, staff meetings, and tours of manufacturing areas. With Video for Windows, this casual video can now be included easily in reports, presentations and other communications. For example, clips of focus group sessions can be integrated into market research reports, giving greater credibility and urgency to user comments. Professional or produced video can also be incorporated into business communications, including formally pro-

video, are created by professors, not by software engineers. Reference works, such as travel guides and directories, are obvious candidates for video versions. But fiction books can also get the interactive video treatment. The result mixes the traditional novel with the interactive video game.

Technology Requirements for Digital Video

Full color, full motion video contains a tremendous amount of information; each second of video can require 27MB of data. So, one of the key enablers of the digital revolution is increasingly powerful microprocessors that can handle a large amount of information.

Those microprocessors, both as CPUs and coprocessors, are available and popularly priced, and advancements in processor technology are reaching users at an accelerated pace. High-end, 486-based chips that are four to five times faster than 286 chips are gaining increasing market share. Even more powerful x86-based chips will come on the market in the near future, and powerful reduced instruction set computing (RISC) chips are already here. Originally intended for engineering and scientific applications, RISC chips are also showing up in "personal workstations" and peripherals (color printers) for general business use.

Software requirements

Hardware covers just one set of requirements for digital video, and another is software. Compression techniques that make video file sizes manageable must be available. To overcome the problems caused by the massive size of video files, vendors and industry groups have devised various methods that compress data. These methods delete redundant information from images, store them in short-hand form, and expand them for display and use. But these methods — called codecs for compressor/decompressor — vary in how, and how much, data they compress and in their suitability for various applications. Software-only methods, for example, make it easy to distribute video content. Full frame methods are appropriate for video editing.

Microsoft Video for Windows Architecture

Digital video computing is a key component of Microsoft's larger vision of multimedia computing, which includes video, audio, animation, graphics, text, and other digital data types. Microsoft's goal is to extend personal computing with multimedia to increase the productivity of business and organizational users and enhance the flow of useful information among PC users.

Microsoft makes this new vision of personal computing a reality today for millions of PC users. Key elements in this strategy are the Microsoft Windows operating system and Video for Windows.

Windows supports multimedia and digital video computing through a range of system elements, including the following:

The object linking and embedding (OLE) technology that lets users insert multimedia elements, including digital video, into more than 150 business productivity software programs is already in widespread use, including Microsoft Word, Microsoft Excel and applications from third-party vendors.

The Media Command Interface (MCI) allows all Windows-compatible application software to control a variety of multimedia devices, including CD-ROM drives, audio, and animation players. The Digital Video-MCI (DV-MCI) command set, designed by Intel and Microsoft, supports digital video computing.

Audio Video Interleaved (AVI) is the file format for digital video under Windows. The file format itself is designed to be cross-platform compatible, allowing content on Windows-based systems to play on other operating systems as well. Files that have the .AVI extension are AVI files, and the audio and video information contained in them can be accessed, manipulated, and preserved by the full range of Windows-compatible hardware and application software.

To more fully support digital video computing, Microsoft has defined two new interfaces:

Video Capture interface

Installable Codec interface

These interfaces provide hooks to enable third-party products, such as capture boards and compression/decompression algorithms to work seamlessly in the Windows environment.

Video for Windows: A Closer Look

Video for Windows is Microsoft's solution for bringing digital video computing to the mainstream. The software is based on the AVI file format. Video files are conceptually similar to traditional movies. They contain frames of image data that are displayed sequentially and played concurrently with a soundtrack. In a video file, audio and video data are stored together. The term "interleaved" refers to the way video and audio data are alternately stored in a video file.

Video for Windows is a practical solution for bringing digital video to businesses and other enterprises.

Digital video clips can be incorporated easily into existing applications, because the Video for Windows architecture supports OLE and is based on the Windows operating system familiar to millions of users. With OLE, users can include video clips into more than 150 existing OLE-compatible software applications, including presentation graphics packages, word processors, databases and spreadsheets.

Video sequences always appear their best because in the Video for Windows architecture a video sequence automatically takes advantage of all the capabilities of the system it is played on, including color depth; the richness and range of colors available; perceived smoothness; the number of frames per second the computer can display; and, if special hardware is available, image size. These trade-offs are called scalability. For example, users at an advertising agency benefit from scalability because a production manager, whose primary interest is content, can view the small image of a digital video clip on a low-end system, while an art director whose primary interest is image quality can view the same video clip on a high-end system that provides greater image quality.

It's easy for third-party developers and end users to work with the Video for Windows architecture because it is an extension of Windows. The Video for Windows architecture uses the same programming model as Windows and supports industry stand-

ard file formats and interfaces.

Any Windows-based user with a 386 PC or higher can play back digital video because the basic playback components are built into Windows. Users that want to edit digital video need only to purchase the Video for Windows product, for a suggested retail price (SRP) of \$199. Users who want to record and to create digital video sequences need the Video for Windows product and a hardware capture board, which are available starting at an SRP of \$350. *These are USA prices - Ed*

Video for Windows: Using the Tools

The Video for Windows package contains a collection of tools that enable users to capture and edit digital video sequences. The two primary tools are VidCap and VidEdit, for capturing and editing respectively. Additionally, we have included supplemental tools for editing color bitmaps, waveform audio files, and color palettes, as well as a utility for converting Apple QuickTime moves to Video for Windows AVI files.

The basic steps to creating digital video are as follows:

- Produce videotape in the traditional analog manner.
- Perform any analog editing and effects.
- Digitize the video and audio (VidCap).
- Perform any digital editing (VidEdit).
- Apply compression to the data (VidEdit).
- Incorporate the video clip (Media Player and/or MCI/AVI driver).

VidCap

VidCap is a data-capture application that lets you capture video sequences onto your computer system. With VidCap, you can capture individual images or entire video sequences from a VCR, a videodisc player, or a video camera and microphone. Capturing one or more frames of an audio-video sequence is a simple task that consists of setting up audio and video sources, preparing your system, and performing

the actual capture. For the capture to be successful, perform the following tasks:

Prepare the capture file by preallocating a block of disk space using the Set Capture File item under the File menu.

Connect the audio sources and set the audio options.

Connect the video sources and set the video options.

Load or capture a color palette for the captured video (8-bit video format only).

Capture the audio and video data.

Use VidEdit to edit, compress and interleave the captured video data.

VidEdit

VidEdit lets you create and edit audio-visual sequences consisting of a series of frames that contain digital-audio and video data. With VidEdit, you can edit one or more frames of a video sequence, adjusting the audio, video, or video-palette components of the frames.

Using VidEdit, you can easily add, delete, or move multimedia data in your video sequences. You can synchronize a presentation by moving sound data to match the video image. When you finish fine-tuning a video sequence, you can generate a compressed, interleaved AVI file. VidEdit lets you adjust compression parameters to allow for factors such as image quality and the data-transfer rate for your particular storage device.

Media Player

Video for Windows includes a new version of the Media Player. Media Player can play several types of media sequences, including digitally recorded sound, Musical Instrument Digital Interface (MIDI) sequences, and video sequences. It can also be used to control any Media Control Interface (MCI) multimedia device installed on your system. For example, you can use Media Player to play video sequences, as well as to control devices that play compact discs and videodiscs.

Media Player can run as a standalone application as an embedded object in a compound document. As an embedded object, it can add sounds, video sequences, and voice messages to spreadsheets, pres-

entations, and word-processor documents. Media Player use Object Linking and Embedding (OLE) technology to become part of another applications document.

Media Player uses the Video for Windows device type when playing video sequences captured and edited with Video for Windows. The Video for Windows device is an MCI device that has its own configuration options. You can set configuration options for Video for Windows and MCI devices by using the Configure command from the Media Player Device menu or through the Control Panel Drivers option.

For the Video for Windows device, the configuration options let you adjust viewing characteristics of a video sequence. The configuration options provide two viewing modes for playing video sequences: window and full-screen. Window mode displays the video sequence in a window and displays the sequence at frame size. Full-screen mode displays the video sequence in the entire screen, using a 320-by-240 pixel display for the video sequence.

Conclusion

Digital video computing will change markedly in the years ahead, but with Microsoft Windows and Video for Windows-based software, the technology and products based on it are a reality today. They can be used in real-world applications today, including business communications, education, interactive training, technical documentation, and information delivery. With Video for Windows, Microsoft is taking a leadership role to help ensure that digital video becomes an accepted and successful reality in the computing marketplace. Microsoft is accomplishing this goal by ensuring that an extensible Windows architecture will support a scalable range of video options today—and tomorrow

Patrick Ford is a Product Manager in the Multimedia and Consumer Systems Group at Microsoft. He has served in this role for such products as the Microsoft Multimedia Extensions for Windows, Microsoft Multimedia Development Kit, Microsoft MS-DOS CD-ROM Extensions (MSCDEX), and most recently, Microsoft Video for Windows.

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InspectA

The Ultimate File Manager for DOS and OS/2

Paul Marwick

InspectA revisited.

Sometime ago, I reviewed David Nugent's InspectA, which is a combination of archive manager, file manager and fidonet mail manager. David has recently released a new version, which adds a number of useful enhancements to an already excellent product.

InspectA provides a wide range of functions. It provides a windowed file display, which can be set to suit personal taste. It allows for file tagging and mass operations on files (such as copying, moving, deleting, etc.) It allows similar manipulation of files within archives.

Brisbug is pleased to draw its members' attention to Australian-authored shareware ... particularly when it is as good as this program. The Shareware version is available on all four of our BBSs and from the library

New in Version 1.1

Version 1.10 is a considerable enhancement over version 1.0. It still has the same basic functions as version 1.0 - file management, archive management, and mail management. But the look and feel of the program has changed a great deal.

Where version 1.0 obtained its setup parameters from an ASCII text file, compiled at run time, version 1.10 adds a new program, which builds INSPECT.INI directly. This is a good deal easier to use, since it provides the user with a menu driven setup facility. The setup program (ICONFIG.EXE) also has the capability of exporting InspectA's setup data to a text file, which can then be edited and re-imported if necessary.

File management functions provided by InspectA are extensive. It covers copying, moving, deleting of individual files or marked groups of files. It also has the ability to execute user defined external programs on individual files or marked groups of files.

With the addition of external programs (of the user's choice), files can also be viewed and edited. By default, InspectA will use Qedit for editing, and List for file viewing, but these defaults can be changed to suit individual preferences.

Archive management functions

Archive management functions are just as extensive as file management functions. InspectA understands most of the archive formats available for the PC, and will handle files archived with any of them quite transparently. Its abilities in handling archived files cover extracting individual files from within an archive, viewing them, deletion of individual files from within an archive, as well as selective

extraction to a user selected path. It also now has the ability to repack individual archives or groups of marked archives, optionally running a virus scanner on the files within the archive(s).

Handling self-extracting archives

As a final touch to archive management, InspectA will now recognize and displays self-extracting archives correctly. It will also allow individual files to be extracted from self-extracting archives.

Viewing of archive contents is handled internally. Extraction or other manipulation of files within archives requires external programs (the archiving programs themselves, plus any viewing programs).

As well as file and archive management, InspectA can operate as a command shell. Pressing F10 pops up a command window, which allows any DOS command to be executed. This command window has command recall, so pressing the up arrow will scroll through a list of any previously executed commands. It is also easy to associate a command with a particular filename or particular file specification (so that pressing return while the cursor is over file with the extension of .wp will always start your word processor and load the file).

A new menu interface

InspectA 1.10 adds a new menu interface. This interface provides access to the majority of its functions, and can be activated in a number of different ways. A pull down menu can be selected using a mouse, or by tapping the ALT key, or by entering a slash (/). In addition, many functions are

"With the addition of external programs, files can be viewed and edited"

directly accessible via function keys or via other key combinations. The ALT key menu activation can be disabled, which is useful in an environment such as DESQview or OS/2, where tapping the ALT key is used to bring up a system menu.

InspectA 1.0 was capable of having its keyboard re-defined almost completely. However, in version 1.0, this capability was available only in registered versions. In version 1.10, this capability is available in the unregistered version as well as in the registered version. It is also a great deal easier to make use of, since such definitions are all handled through the menu driven configuration program (ICONFIG), which can be run either independently or from within InspectA.

Version 1.0 was restricted to viewing a single directory at a time. Version 1.10 now has the capability of having multiple directory views open at the same time. In addition, each directory view can be customised in terms of its size and its position on screen. Such directory views can then be saved, so that they are recreated each time InspectA is started.

As in the earlier version, InspectA accepts keystrokes to control file movement. So, if I want to view the file ZZZZ.ZIP, I can enter ZZZ, and InspectA will move the cursor to the file which matches my entered keystrokes. The same ability is available in a directory tree view, and also in the predefined directory listing. This ability to search on keystrokes makes it very easy to find files or directories, without having to move the cursor using either the cursor keys, or the mouse.

Mouse support

One of the other new features of InspectA 1.10 is its support for mouse operations. All file movements and menu selections can now be accessed using a mouse. In addition, reseizing and moving view windows on the screen can also be accomplished using a mouse.

One of InspectA 1.0's main features was its ability to handle file descriptions, using a format compatible with 4DOS's description files, and also compatible with the FILES.BBS format used by many BBS systems. This allows a useful description to be associated with an individual file. That description will stay with the file, so long as any copying or moving (or

InspectA in action

The following series of screen dumps shows a typical InspectA session

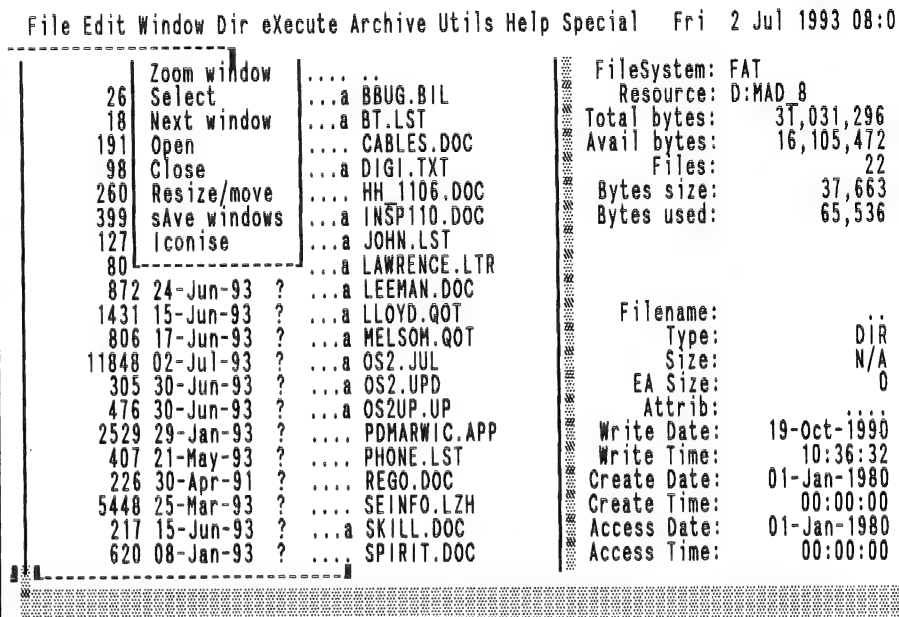


Figure 1. Showing the Window menu, which allows for movement between multiple windows, opening new windows, plus resizing and moving of windows. The statistical display on the right hand side of the screen can be enable or disabled as required.

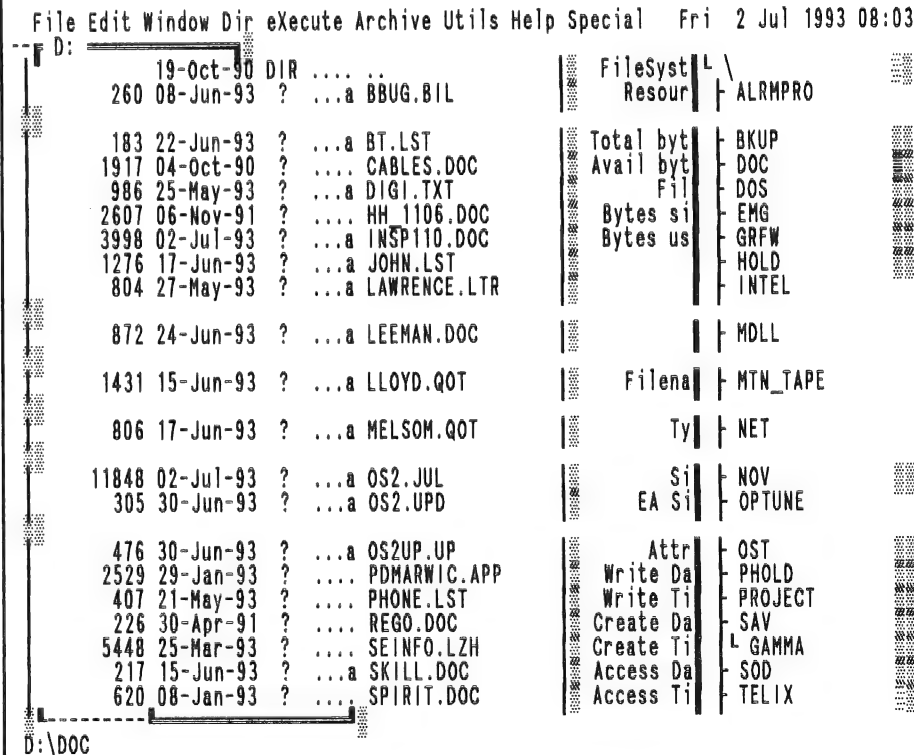


Figure 2. Showing the directory tree view on the right of the screen. This is produced by pressing <F9>, or it can be selected from the pull-down menus

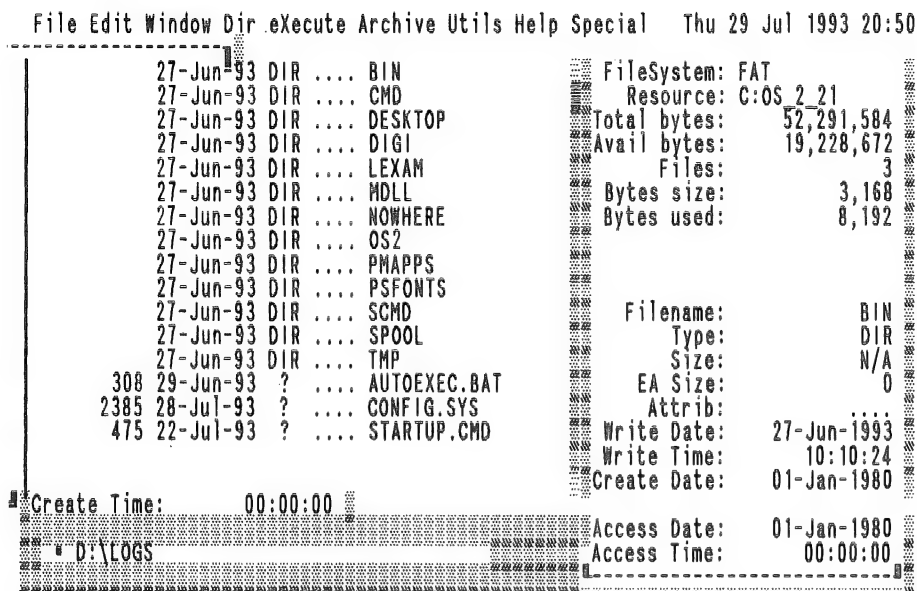


Figure 3. In this view the root directory of C: is displayed, and below it d:\LOGS is also logged, but iconised out of the way. Selecting the button on the left hand side the bottom line will bring the second directory to the foreground.

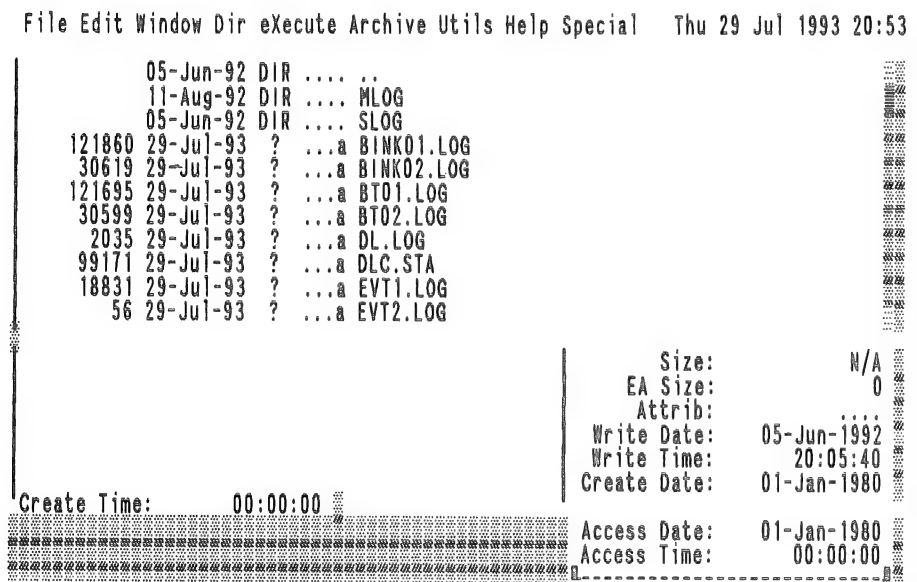
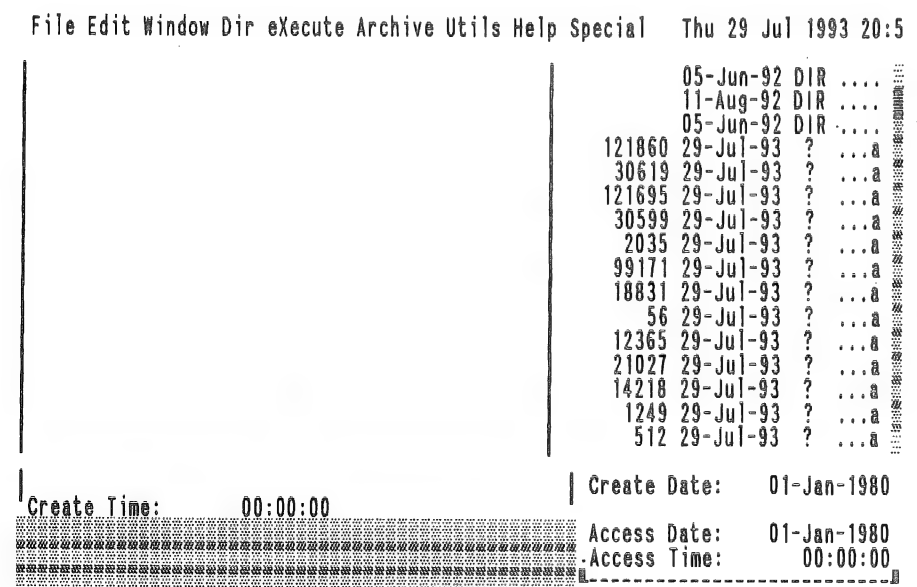


Figure 5. Now the second directory is displayed



modifying, as in the case of repacking an archived file into a new format) is done using InspectA. InspectA also provides editing capabilities for the file descriptions. Pressing the INSERT key while the cursor is positioned over a file produces an entry box which allows a description to be entered, or an existing description to be edited. In addition, if a description is too long to view on screen, it can be scrolled from within the edit window. Descriptions can also be applied to directories, as well as to individual files.

Facilitating directory access

As well as being able to display both file and directory tree views, InspectA has the ability to create a list of directory paths, and allows a description to be associated with these directory paths. Pressing Alt-I will bring up the list of pre-defined directories, and quick movement to any of those directories can then be accomplished by moving the cursor to the desired directory and pressing the enter key. In this way, directories which you often need to use can be made very quickly accessible. The directory index feature can also be used in file copy or move operations - once the command to move or copy a file (or tagged group of files) has been given, pressing the F8 key will pop up the directory index listing, allowing you to select a directory from the index as the target for the copy or move operation.

InspectA possesses "smart" screen handling. By default, it will come up in whatever mode the screen was in prior to its execution. It can also be set to come up in either a standard EGA/VGA mode, or in a custom mode supported by the video card that you are using.

Network awareness

InspectA is fully network aware, and will operate correctly with the majority of network systems, including correctly displaying and handling files on NFS (the Sun Network File System) mounted drives. It will also handle removable media, ranging from floppy disks to CD-ROMs (though music CD's in a CD-ROM drive *do* tend to confuse it a little...).

Figure 6. (left). The second directory display can be sized and moved to allow the most convenient viewing.

Mail handling

I've really not even touched on InspectA's mail handling capabilities, since they are liable to be of interest to only a small percentage of the potential users of the program. However, if you are involved in Fidonet technology mail, InspectA has a number of very useful functions in that area as well. It understands the addressing conventions used in Fidonet-style mail, and will display the destination (or origin) addresses of mail bundles. It is also capable of extracting individual messages from such mail bundles, and displaying them with all the correct attributes (something not possible with most file viewers, since the header information in such messages is binary data, even though the text is ASCII text).

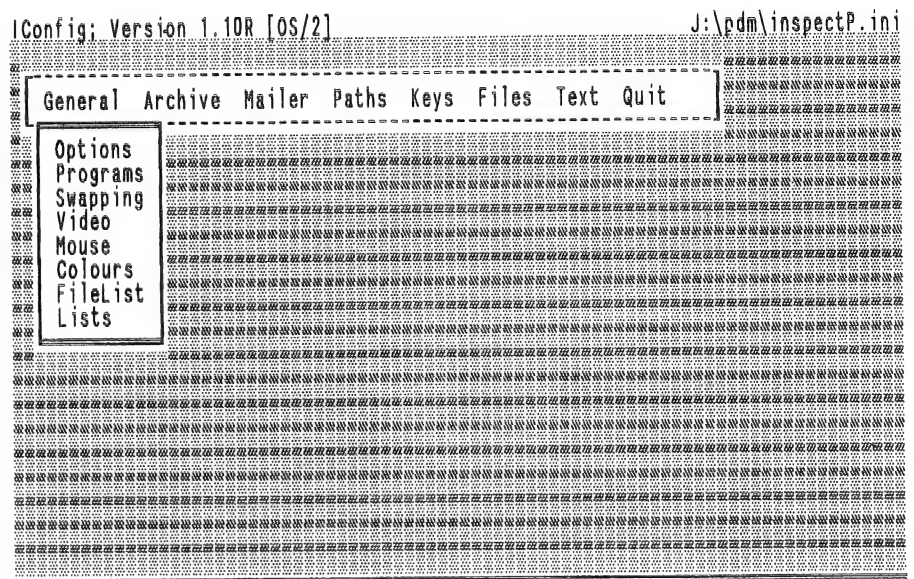
Installation

Installation is very easy. The InspectA archive contains an installation batch file which will load Iconfig, read in a set of default parameters and then launch InspectA. The defaults provided can then be modified to suit individual use and taste.

The shareware version of 1.10 is annoyware (of a very mild sort). While version 1.0 was somewhat restricted in its capabilities until registered, version 1.10 is fully functional. In order to encourage registration, it will occasionally beep at you and produce a box suggesting that it would be a nice idea to register it.

Prior to its release, I discussed the annoyware idea with David, and expressed the opinion that annoyware often discourages me from considering registration, or even making use of the program. However, having made extensive use of the shareware version, I don't find its reminders annoying. They are infrequent enough

InspectA in action (continued)



Set default options

Figure 6. Shows the ICONFIG menu. Through this interface, almost all InspectA's operations can be customised to suit the individual user

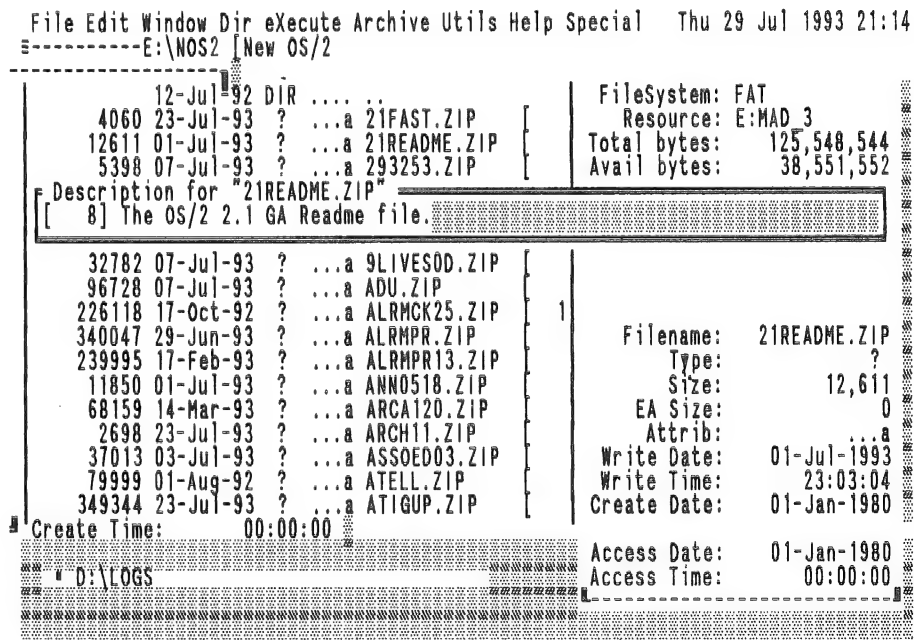


Figure 7. Showing the File Description Edit window. From here, a description can be entered, modified or deleted. A "history" function is also supported, allowing a description to be loaded from another file description.


```
File Edit Window Dir eXecute Archive Utils Help Special Thu 29 Jul 1993 21:22
-----E:\NOS2 [New OS/2]
12-Jul-92 DIR ....
4060 23-Jul-93 ? ...a 2IFAST.ZIP [
12611 01-Jul-93 ? ...a 21README.ZIP [
53 Directory Index -----
2343 Outbound directory 53660k D: 296
2615 Inbound files directory 53660k D: 760,094
37 820 Inbound 53660k d: 067,136
327 823 Inbound 53660k d:
967 Upload Holding Area 53124k H:
2261 Recent uploads 32324k F:
3400 New OS/2 Software 37648k E: DME.ZIP

2399 Archivers 29532k G: ?
118 Batch Utilities 53124k H: 12,611
681 Comms Software 32324k F: 0
26 Communications Utilities 53124k H:
370 Database Related 29532k G: ul-1993
799 Virus Detection/Protection 29532k G: 3:03:04
3493 -----
Create Time: 00:00:00
Access Date: 01-Jan-1980
D:\LOGS Access Time: 00:00:00
```

Figure 8. Showing the Directory Index view. In each instance the description of the directory is displayed, along with the drive on which the directory is located, and the amount of free space on that drive. Moving the cursor keys, or entering a few characters from the description, will allow movement to that directory

```
File Edit Window Dir eXecute Archive Utils Help Special Fri 30 Jul 1993 00:25
09-Mar-93 DIR ....
184 29-Jul-93 ? ...a .crinit
1972 29-Jul-93 ? ...a .crisp
865 27-Jun-93 ? .h.a Ciskmap.ind
1600 27-Jul-93 ? .h.a Diskmap.ind
1228 12-Jul-93 ? .h.a Eiskmap.ind
482 10-May-93 ? .h.a Fiskmap.ind
989 15-Apr-93 ? .h.a Giskmap.ind
703 26-Jul-93 ? .h.a Hiskmap.ind
811 26-Jul-93 ? .h.a Iiskmap.ind
8087 28-Apr-93 ? ...a INSPECT.INI
139 16-May-93 ? ...a inspect.sav
6260 29-Jul-93 ? ...a INSPECTP.INI
661 17-Jul-93 ? .h.a Jiskmap.ind

FileSystem: HPFS
Resource: J:HAD 6
Total bytes: 133,152,768
Avail bytes: 44,592,128
Files: 13
Bytes size: 23,981
Bytes used: 27,136

Filename: .crinit
Type: ?
Size: 184
EA Size: 0
Attrib:
Write Date: 29-Jul-1993
Write Time: 23:41:22
Create Date: 09-Mar-1993

Create Time: 15:10:48
Access Date: 29-Jul-1993
D:\LOGS Access Time: 23:41:22
```

Figure 9. Showing the OS/s version of InspectA's handling of HPFS file names. It also displays the drive index files that InspectA can create and maintain to provide rapid display of the directory structure of the available drives.

not to discourage me from using the program, and they don't interfere with its functionally. I hope they provide sufficient encouragement for people to be prepared to register - InspectA is an extremely useful program, and I hope David finds it worthwhile continuing its development. Some of his future development plans (including a fully graphic OS/2 version, and possibly a windows version, inbuilt editing and file viewing capabilities and a full BBS files management function) are very promising.

Producing a full list of all InspectA's features would take a great deal of space and a great deal of time. Hopefully I've illustrated a few of those features enough to encourage you to try it out - in my opinion, its about the best file manager around. For more detail, the manual provided in the archive (which is also supplemented by an extensive online help system) is well worth reading.

A native OS/2 version

With the release of version 1.10, a second version was also released. This version is a native OS/2 application, providing all InspectA's benefits to OS/2 users as well as to DOS users. A future version is intended to make use of the OS/2 graphic environment, but, for the moment, InspectA/2 is a text mode application. It is a full OS/2 application, since it understands the OS/2 file system fully, and is able to not only display long filenames on an HPFS partition, but also to safely copy and move OS/2's extended file attributes.

Conclusion

All in all, InspectA is an excellent product. Not only is it Australian in origin, it is a good, cheap alternative to commercial file management tools such as Xtree Gold or Norton Commander. Well worth trying out. Personally, I don't think I could operate without it any more.

INSP110D.ZIP (from any of the BBS lines) - DOS version.

INSP110P.ZIP (from line 3 or 4) - OS/2 version.

Multi-table databases

Raman Vasram and Dan Emerson.

Derek works for himself. He manages a mail order business. He sources several items and sells them at a profit. He uses a personal computer because it is interesting and he feels it saves him time. He liked working from the dBase dot prompt because it is quick by not having to operate through the menus and it gives him a sense of control.

He maintains a list of the items purchased from his supplier. The list is in the form of a dBase table. Having access to the information on disk definitely saved time. To order items he clears the ORDER field with a REPLACE ALL FIELDS WITH 0 command and then browses through the table and typed in the number required. He is able to freeze the input to the ORDER field with the BROWSE FIELDS ITEM, ORDER FREEZE ORDER command. Order requirements go in quickly and Derek prints out a list for attaching to an order. It takes four steps. SET PRINT ON sets the output of dBase to printer. LIST ITEM, COST, ORDER, COST*ORDER FOR ORDER > 0 OFF gives him a list of items, their cost, the number on order, and the line total. SUM COST*ORDER FOR ORDER > 0 gives him a total. SET PRINT OFF turns the printer output off.

The sequence looked like Figure 1 (opposite)

Improving the already good

Derek ran this sequence for a couple of months until a friend who had been to BRISBUG told him about command files. In their simplest form, they are a list of commands stored in a file which will run when executed from dBase. 'Rather than having to type the commands in each month,' his friend told him 'all you have to do is create a file with all the commands in and it will carry out the commands when you run it!' Derek used the built in dBase text editor. The MODIFY COMMAND command started it up. The name of the file was to be ORDERS. He typed in MODIFY COMMAND ORDERS and typed in the following set of commands.

```
USE ITEMS
BROWSE FIELDS ITEM,COST,ORDER
FREEZE ORDER
SET PRINT ON
LIST, COST,ORDER,COST*ORDER
      OFF FOR ORDER > 0
SUM COST*ORDER
SET PRINT OFF
```

Derek saved the file with the Control-End key stroke. To run it he typed

```
DO ORDERS.
```

It worked.

Modifying for growth

This system fulfilled Derek's needs for some time until he discovered other suppliers of his products. Soon he began to source from several places. This required more information to be stored on the computer. He used the MODIFYSTRUCTURE command to add the fields SUPPLIER,

PHONE, ADDRESS, CITY, POSTCODE to the ITEM table. This did turn out to be such a brilliant idea. Computers were supposed to save time yet here he was typing in suppliers' details several times, once for each item relating to that supplier. Derek swallowed his annoyance and typed in the details. All went well until a supplier changed address. Derek's dissatisfaction grew. Here he was on his two thousand dollar plus supermicro typing in the same change to many records in the table. Not only that he got the phone number wrong in one record and phoned the local bank manager by mistake. Things got worse. While updating an address he missed a record. The cheque had gone off with an order to the old address and it was almost three weeks he was out of stock, right near the end of the financial year when his customers were spending up to balance the books. Computers !!!

What Derek needed was a separate table for his suppliers. The warning sign that the table needs splitting was when

```
. USE ITEMS
. BROWSE FIELDS ITEM,COST,ORDER FREEZE ORDER
```

ITEM	COST	ORDER
Diskettes DS/DD 3.5"	10.00	3
disk box	12.00	5
Mouse Mat	4.20	0
Mouse	16.05	3

```
. SET PRINT ON
. LIST FIELDS ITEM,COST,ORDER,COST*ORDER OFF FOR ORDER > 0
ITEM          COST  ORDER  COST*ORDER
Diskettes DS/DD 3.5" 10.00    3      30.00
disk box         12.00    5      60.00
Mouse            16.05    3      48.15

. SUM COST*ORDER
  4 records summed
  COST*ORDER
    138.15
. SET PRINT OFF
```

Figure 1. Derek sets up his database to print a product list

repetition of information occurred. Derek was on track when his gut feeling told him he should have to store the supplier details once only!!! The situation with Derek's data is known as a one to many. The supplier details are stored once but a supplier may supply many items and thus may appear many times in the Items table.

How are the tables related?

Once the supplier table is created and the information is stored for each supplier in one record, a unique code is assigned to each supplier. In the Items table the supplier details are deleted and replaced with a field to store this new supplier code. This method has a number of advantages. Updates to suppliers have only to be entered once. To change an item from one supplier to another only the supplier code in the items table needs to be altered. There is a big saving in disk space since only a code for the supplier is stored with each item record.

The Items table has a structure looking like this:-

Num	Field Name	Field Type	Width	Dec	Index
1	CODE	Numeric	3	0	Y
2	ITEM	Character	20		Y
3	COST	Numeric	6	2	N
4	ORDER	Numeric	6	0	N
5	SUPP_CODE	Numeric	3	0	Y
6	CURRENT	Logical	1		N

....and data set like this:-

CODE	ITEM	COST	ORDER	SUPP_CODE	CURRENT
1	Diskettes DS/DD 3.5"	10.00	3	1	T
2	disk box	12.00	5	1	T
3	Mouse Mat	4.20	0	3	T
4	Mouse	16.05	3	2	T
5	Mouse cover	2.29	5	1	T
6	Mouse ball	5.92	2	1	T
7	Antistatic cover	6.21	3	3	T

The Supplier Table has a structure like this:-

Num	Field Name	Field Type	Width	Dec	Index
1	CODE	Numeric	3	0	Y
2	NAME	Character	20		Y
3	PHONE	Character	10		Y
4	CURENT	Logical	1		N

.... and a data set like this:-

CODE	NAME	PHONE	CURENT
1	Computer Supplies	222 2222	
2	Bee Disk Supply	332 3323	T
3	Quick Mos	434 4444	T

How is all of this executed in dBase?

First select the first work area and open the Items file.

```
SELECT 1
USE ITEMS
```

Select another work area and open the Supplier Table. Supplier must be indexed on code and the index must be set active with the ORDER command.

```
SELECT 2
USE SUPPLIER
SET ORDER TO CODE
```

Select the original work area. It may now be called by its alias name.

```
SELECT ITEMS
```

A relationship needs to be set from the supplier code field SUPP_CODE in the Items table into the indexed supplier table. (Stress again, Supplier must be indexed on CODE and the order set to CODE).

```
SET RELATION TO SUPP_CODE INTO SUPPLIER
```

Once the relationship is set, the record pointer in Supplier will always point at the Supplier record with the same code as the Items record. Fields from the Supplier work area can be referenced with the alias convention e.g SUPPLIER->PHONE, SUPPLIER->POSTCODE.

A typical command using the browse command would appear as

```
BROWSE FIELDS ITEM, COST, ORDER,
SUPPLIER->NAME, SUPPLIER->PHONE
FREEZE ORDER
```

...and the view of the two joined tables looks like Figure 6

The ORDERS file

Derek spent a couple of nights writing a new command file called ORDERS. He got carried away with how quickly he was able to pick up the ideas behind programming dBase. His wife, Deanne, didn't like it all that much when he stayed up instead of coming to bed. She decided to become involved and they wrote the command file below. It has a couple of small problems and they want to make it issue order numbers as well.

Notice in this command file there are comments surrounded by stars. When the character star * (don't ask me to spell asterisk) starts a line it is ignored by dBase and can be used as a remark. Notice there is a mixture of upper and lower case. The combination makes it easier to read particularly when defining numeric or string memory variables

e.g. nOrderTotal=0 is easier to read than NORDERTOTAL=0


```
*****
*                                *
*      ORDERS.PRG                *
*                                *
*      by  Derek and Deanne      *
*      (what a team)             *
*****vers 1.2****28/07/93*****
Set Talk Off
  ** Part A  OPENING TABLES
**Open Items Table **
SELECT 1
  USE ITEMS
** Open Supplier Table **
SELECT 2
  USE SUPPLIER
  SET ORDER TO CODE
SELECT ITEMS
  ** set relationship between Item and Supplier **
  SET RELATION TO SUPP_CODE INTO SUPPLIER
  **PART B : GETTING DATA **
  ** browse
  BROWSE FIELDS ITEM,COST,ORDER,
    SUPPLIER->NAME,SUPPLIER->PHONE FREEZE ORDER
  ** PART C: PRINTING LIST OF ORDERS***
** index by supplier **
set safety off
index on SUPPLIER->NAME to ITEM
set safety off
** Print order loop**
set print on
num=35
nSupplier=0
nOrderTotal=0
** LOOP**
Do while .not. Eof()
  if .not. nSupplier=SUPP_CODE
    ** new supplier**
    ? 'Order Summary SUPPLIER '+ SUPPLIER->NAME+ '
      Phone '+ SUPPLIER->PHONE
    ?
    ? 'item cost  number total'
    ? nSupplier=SUPP_CODE
  endif
  if Cost*Order>0
    ? ITEM,COST,ORDER,str(COST*ORDER,6,2)
    nOrderTotal=nOrderTotal+COST*ORDER
  endif
  SKIP
  if .not. nSupplier=SUPP_CODE
    ** ? order total **
    ? Space(num)+ '_____'
    ? space(num)+ str(nOrderTotal,6,2)
    ? space(num)+ '_____'
    nOrderTotal=0
    bOrdered=11f(COST*ORDER>0,.T...F.)
```

```
?
endif
Enddo
set order to code
set print off
set talk on
clear all
*****
return
*****
```

The Output

When executed through dBase, the command file (program) produces the output listed below.

Order Summary SUPPLIER		Bee Disk Supply	Phone 332 3323
item	cost	number	total
Mouse	16.05	3	48.15
			48.15
Order Summary SUPPLIER		Computer Supplies	Phone 222 2222
item	cost	number	total
Diskettes DS/DD 3.5"	10.00	3	30.00
disk box	12.00	5	60.00
Mouse cover	2.29	5	11.45
Mouse ball	5.92	2	11.84
			113.29
Order Summary SUPPLIER		Quick Mos	Phone 434 4444
item	cost	number	total
Antistatic cover	6.21	3	18.63
			18.63

Derek is happy. No more does he have multiple copies of information about a suppliers some of which is out of date. His super micro is now doing what he considers is a super job.

ITEM	COST	ORDER	NAME	PHONE
Diskettes DS/DD 3.5"	10.00	3	Computer Supplies	222 2222
disk box	12.00	5	Computer Supplies	222 2222
Mouse Mat	4.20	0	Quick Mos	434 4444
Mouse	16.05	3	Bee Disk Supply	332 3323
Mouse cover	2.29	5	Computer Supplies	222 2222
Mouse ball	5.92	2	Computer Supplies	222 2222
Antistatic cover	6.21	3	Quick Mos	434 4444

Figure 6. The appearance of the joined tables after Derek's hard work

Removing DoubleSpace from Your Computer

There is no method for automatically removing DoubleSpace.

There are two ways to remove it manually:

1. Back up the files on all your compressed drives, remove DoubleSpace, and then restore the backed-up files onto your uncompressed drive. (Note that all the files currently on your compressed drive(s) might not fit on your hard disk after you remove DoubleSpace.)

2. Move as many files as possible from your compressed drive to your uncompressed drive, reduce the size of your compressed drive to free space on the uncompressed drive, and keep moving files and shrinking the compressed drive until no more files remain on the compressed drive. Then, remove DoubleSpace.

Important:

The drive letter of your uncompressed drive may change after you remove DoubleSpace. If it does, any files or programs configured for use on the uncompressed drive (for example, your Windows permanent swap file) will need to be reconfigured.

The Backup and Restore method

1. Delete any unnecessary files from your compressed drives.
2. Back up the files on all compressed drives. If your backup program is located on a compressed drive, make sure you copy the backup program files to an uncompressed drive or to a floppy disk.

If you are using Microsoft Backup for MS-DOS, you need to copy the following program files:

MSBACKUP.EXE
MSBACKUP.OVL
MSBACKUP.INI
MSBACKDB.OVL
MSBACKDR.OVL
MSBACKFB.OVL
MSBACKFR.OVL
MSBCONFIG.OVL
DEFAULT.SET
MSBACKUP.LOG
MSBACKUP.RST

3. To determine which drive is your uncompressed drive, type `dblspace /list` at the command prompt. The uncompressed drive is listed under the CVF Filename column.

For example, if `H:\DBLSPACE.000` is the CVF Filename associated with drive C, drive H is the uncompressed drive.

4. If you are removing DoubleSpace from your startup drive, copy the `COMMAND.COM` file from your compressed drive to the root directory of your uncompressed drive.

5. Make your uncompressed drive the current drive. For example, if drive H is your uncompressed drive, type `H:` at the command prompt. To change to the root directory, type `cd\` at the command prompt. If you want to delete all of your

DoubleSpace drives, type the following at the command prompt:

```
deltree dblspace.*
```

6. To delete just one of your DoubleSpace drives, use the `deltree` command to delete the CVF for the drive. (The `dblspace /list` command also shows the CVF names for your drives.)

For example, if the CVF is `DBLSPACE.000`, type the following at the command prompt:

```
deltree dblspace.000
```

7. Restart your computer.
8. Restore your backed-up files. If your Backup program files are on a floppy disk, copy them to the hard disk first. Then run the Backup program from your hard disk.

Note:

You might need to retrieve your catalog file from your backup floppy disks. To do so, choose the Catalog button in the Restore dialog box.

The Move-and-resize method

1. Delete any unnecessary files from your compressed drives.

To determine which drive is your uncompressed (host) drive, type `dblspace /list` at the command prompt. The uncompressed drive is listed under the CVF Filename column. For example, if `H:\DBLSPACE.000` is the CVF Filename associated with drive C, drive H is the uncompressed drive.

2. Delete any unnecessary files from the uncompressed drive, including your Windows permanent swap file (if any).

3. Change to your compressed drive, and then type `dblspace /size` at the command prompt. DoubleSpace will reduce the drive's size as much as possible, which

will free some space on the uncompressed drive. (If you have more than one compressed drive, carry out this step for each one.)

If DoubleSpace cannot reduce a compressed drive's size because the drive is too fragmented, run Microsoft Defragmenter by typing defrag at the command prompt. When Defragmenter completes, type dblspace/size at the command prompt.

4. Use the move command to move files from the compressed drive to the uncompressed drive until only .5 MB of free space remains on the uncompressed drive.

5. Repeat steps 3 and 4 until your compressed drives do not contain any files you want to keep.

6. If you are removing DoubleSpace from your startup drive, copy the COMMAND.COM file from your compressed drive to the root directory of your uncompressed drive.

7. Make your uncompressed drive the current drive. For example, if drive H is your uncompressed drive, type H: at the command prompt. To change to the root directory, type cd\ at the command prompt. If you want to delete all of your DoubleSpace drives, type the following at the command prompt:

```
deltree dblspace.*
```

If you want to delete just one of your DoubleSpace drives, use the deltree command to delete the CVF for the drive. (The dblspace /list command also shows the CVF names for your drives.) For example, if the CVF is DBLSPACE.000, type the following at the command prompt:

```
deltree dblspace.000
```

8. Remove all references to dblspace from your CONFIG.SYS and AUTOEXEC.BAT files.

9. Restart your computer.

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Environmental Sensing Notes

Dan Emerson

Last month we did not get Pat Andersen off the ground and we will try to get him for this meeting. Thanks to the members who turned up to support the session last time.

Electronic transducer

Pat Andersen, QUT lecturer in electronics, is building us an electronic interface to place between the sensor and the computer. Pat is on the agenda for this meeting. The interface will enable the output from the transducer to be scaled and zero points set. A typical transducer will change temperature into electrical resistance and can measure several hundred degrees. We may wish to measure a limited range, say body temperature. Pat's device will allow the amplification of the sensor signal of from the limited range to match the games port input. Pat runs these beautiful introductory electronics sessions through South Brisbane TAFE.

Direction of rotation sensor

Richard Vander Have presented an interesting method for indicating direction of rotation e.g. a wind cock. The design consists of a series of concentric circles on a transparent medium. The innermost circle has two halves, one opaque the other transparent. The next circle has four lobes, adjacent lobes are of differing optical density. The next circle has eight lobes with the same pattern. The next layer has sixteen lobes and so on. A series of binary sensing device in a row along a radius read the state of each circle. The binary pattern can be calibrated to the rotation of the shaft holding the circle. Do us an article Richard!

Peter Wyer presented a single bit opto-coupled device that detect the presence of an opaque object.



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Sorting - Bubble, Shell & Quicksort methods

This month we'll examine some sorting methods in preparation for next month's article where a non-recursive Quicksort will be used to sort the filenames in the QDIR directory listing program (Learning QBASIC #10, SigBits, April 92).

You'll discover that there seems to be a direct relationship between the complexity of the sorting method and the overall performance. Since the gains in performance can be enormous it's worth the effort to develop some understanding of the more complex sorting operations. We'll also take a quick look at recursion (a procedure calling itself) and see how a stack data structure can be used to temporarily store program details.

It is vital that you type in the programs and follow along, tracing the operation on your computer, as you read the description of how a algorithm works. Otherwise, it will be very easy to read without understanding.

The Bubble Sort

Any sorting procedure involves moving through a list of values and comparing any two of them. A swap then occurs if Value A > Value B, if it's an ascending order sort. If a descending sort order is required then the swap occurs when Value A < Value B.

Consider the following values:

3 ← Value A
2 ← Value B
1
4

In an ascending order bubble sort "3" is first compared with "2". Since the first value is greater then the second value, a swap occurs.

Next "3" is compared with "1".

2
3 ← Value A
1 ← Value B
4

Again a swap occurs. Then "3" is compared with "4":

2
1
3 ← Value A
4 ← Value B

No swap occurs. This completes the first "pass" through the list. As you can see it is not sorted yet. Another pass is then performed. The first comparison is:

2 ← Value A
1 ← Value B
3
4

	Bubble			Shell			Shell-Metzger			QuickSort(recursive)			QuickSort(iterative)		
	R	S	I	R	S	I	R	S	I	R	S	I	R	S	I
100 Items															
Passes	91	1	100	32	6	13	7	5	7	-	-	-	-	-	-
Compares	9009	99	9900	2891	503	1094	978	603	768	-	-	-	-	-	-
Swaps	2652	0	4950	438	0	260	438	0	260	205	72	158	162	0	50
Time	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
1,000 items															
Passes	951	1	1000	66	9	21	7	7	10	-	-	-	-	-	-
Compares	950K	999	999K	63K	8006	19K	17K	9006	13K	-	-	-	-	-	-
Swaps	245K	0	500K	2891	0	4700	8231	0	4700	2818	976	1583	2354	0	500
Time	6.5	<.1	8.9	.4	<.1	.1	.2	<.1	<.1	.1	<.1	<.1	<.1	<.1	<.1
10,000 items															
Passes	9810	1	10K	143	13	28	14	9	14	-	-	-	-	-	-
Compares	98M	9999	100M	1.4M	120K	260K	281K	130K	183K	-	-	-	-	-	-
Swaps	25M	0	50M	156K	0	63K	156K	0	63K	35K	8190	16K	31K	0	5000
Time	671	<.1	890	9.9	.7	2.2	3.3	.8	.8	1.6	.9	1.0	1.2	.6	1.2
R = Random numbers S = Already sorted I = Already inversely sorted. K & M are used here to mean 1,000 & 1,000,000. Compiled versions (QB v4.5) used for timing. Timed versions included no Passes etc. counting. Times in seconds. Passes and Compares are not counted for Quicksorts as they become more difficult to interpret.															

Figure1. Performance comparison for sorting methods discussed in this article

After this swap you can see that the list is sorted, but the program doesn't know this yet, so another two comparisons will need to be performed to complete the second pass through the list.

The question then becomes "All right, we've made two passes. How do we get off this merry-go-round ie. how does the program know that the list is sorted?"

The answer is to perform another pass and see if any further swaps occurs. If none occur then the list is sorted.

This method of repetitively working consecutively through a list of values is called a Bubble sort because smaller values "rise" smoothly in the list (if it's an ascending sort) as the sort progresses through each pass, like bubbles rising gracefully to the surface of a liquid. Also, the "bubbles" can only rise 1 place at a time, so it takes a relatively long time for them to move far ie. the sorting will be very slow with a large list of values. Compare the performance of the Bubble sort with other sorting algorithms in Figure 1.

We can see here the four components of a sort:

1. A method of systematically working through a list of figures (the sorting algorithm).
2. The comparison of two values. (In most sorting algorithms the two values being compared won't be next to each other in the list.)
3. A swap if the condition is True.
4. A means of indicating that the list is completely sorted. (More complex algorithms may work through smaller and smaller divisions of the list so that, when they run out of things to divide, the sort is completed.)

Create the BUBBLE.BAS program shown in Figure 2 and single-step through it by pressing F8. You should completely understand the operation of the Bubble sort before proceeding on to more complex algorithms.

A Sorting Workbench

To make it easier to investigate the operation and performance of various sorting algorithms create the SORTTEST.BAS program in Figure 3.

The program, as presented initially, creates arrays of 100, 1000 and 10,000 element size and fills these arrays with a random

integer sequence. The number of passes, swaps and compares is counted. When you are measuring timing performance you should *rem* out the counting lines inside the sort program under evaluation as they slow performance slightly.

After investigating the bubble sort's performance with random numbers, *rem* out line 13 and test the best-case scenario (the list is already sorted eg. we've just added a new value to a sorted list) by *unreming* line 14. Then *rem* out line 14 and test the worst-case scenario (the list is already sorted, but in the reverse direction to what is required) by *unreming* line 15.

The CheckForSorted subprogram has been included so that you will be aware if a

sorting routine is not working correctly.

UBOUND(Array) is an inbuilt QBASIC function that returns the highest element number in an array. In this article all the arrays start from 1 so UBOUND(Array) is equivalent to the number of items in an array. If an array didn't start from 1 you could use both UBOUND and LBOUND to determine the number of items in it. In a new QBASIC session (but not in the Immediate window - you can't use DIM there) enter and then run:

```
DIM Test(501 TO 600)
PRINT UBOUND(Test) -
      LBOUND(Test) + 1
```

You should see a value of 100.

```
0001  ` BUBBLE.BAS - demonstrates how a Bubble
                                sort proceeds.
0002  DEFINT A-Z

0003  CONST False = 0, True = NOT False
0004  NumOfValues = 4
0005  DIM NumArray(1 TO NumOfValues)
0006  CLS

0007  FOR x = 1 TO NumOfValues
0008      READ NumArray(x)
0009  NEXT x

0010  DO
0011  SwapOccurred = False ` Reset the swap flag.
0012  Pass = Pass + 1
0013  CLS
0014  PRINT "Pass:"; Pass
0015  FOR x = 1 TO NumOfValues - 1 ` sort loop
0016      FOR a = 1 TO NumOfValues `display loop
0017          SELECT CASE a
0018              CASE x
0019                  PRINT NumArray(a); TAB(6); "Value 1"
0020              CASE x + 1
0021                  PRINT NumArray(a); TAB(6); "Value 2"
0022              CASE ELSE
0023                  PRINT NumArray(a)
0024              END SELECT
0025          NEXT a
0026          Compares = Compares + 1
0027          IF NumArray(x) > NumArray(x + 1) THEN
0028              SWAP NumArray(x), NumArray(x + 1)
0029              Swaps = Swaps + 1
0030              SwapOccurred = True
0031          END IF
0032          PRINT
0033      NEXT x
0034  DO: LOOP WHILE INKEY$ = "" ` Pause here
                                and wait for a keystroke.
0035  LOOP WHILE SwapOccurred

0036  DATA 3, 2, 1, 4
```

Figure 2. A Bubble sort demonstration program.

The Shell Sort

The ability to only compare adjacent items in the list and exchange them if necessary means that many exchanges are required to move a number a large distance in a simple bubble sort. The Shell sort (named after its developer, Donald Shell) compares and swaps, if necessary, pairs of values that are relatively far apart in the list. When all the pairs separated by the initial interval are sorted, the interval is reduced and another round of numerical comparisons, separated by the new interval, is performed, and so on. Finally the interval is reduced to 1. This pass is then equivalent to a bubble sort since the numbers being compared are adjacent in the list. By this stage however the numbers will be nearly sorted.

To follow the operation of the Shell sort we will sort a sequence of 8 numbers. Referring to Figure 3, alter line 8 to

```
FOR Power = 1 to 1
```

That is: perform this loop only once. Next change line 9 to

```
NumOfItems = 8
```

Rem out lines 13-15 and unrem line 16.

To SORTTEST.BAS add the ShellSort subprogram shown in Figure 4 (over).

Rem out line 23 and add a new line after it:

```
CALL ShellSort (Array())
```

Refer to Figure 5 (over).

The first interval value (or "Jump") is 4 so the first comparison is between Array(1) & Array(5) which hold the respective values of 5 & 6. 5 is not greater than 6 so operation continues on to Array elements 2 & 6. Here the value in Array(2) of 8 is greater than the value in Array(6) of 7 so a swap occurs, and so on through the first pass.

On the second pass no numbers are out of order when compared at an offset of 4 but a full pass is required to determine this. Since SwapOccurred remains False, line 318 causes operation to fall through to the outer loop which halves the jump interval before commencing again on passes through the inner loop.

The superiority of the Shell sort over the bubble sort is not so apparent on such a small list but by referring to Figure 1 you can clearly see that it is.

```
0001 ' SORTTEST - a workbench to investigate sorting
                                behaviour.
0002 DEFINT A-Z
0003 DECLARE SUB BubbleSort (Array())
0004 DECLARE SUB CheckForSorted (Array())

0005 DIM SHARED Passes%, Compares%, Swaps%, Jumps%
0006 CONST False = 0, True = NOT False

0007 CLS
0008 FOR Power = 2 TO 4 ' or 1 TO 1
0009 NumOfItems = 10 ^ Power ' or 8
0010 REDIM Array(1 TO NumOfItems)

0011 Passes% = 0: Compares% = 0: Swaps% = 0

0012 FOR x = 1 TO NumOfItems
0013     Array(x) = INT((32000 * RND) + 1)
                                ' Initially random (R)
0014     REM Array(x) = x ' Initially sorted (S)
0015     REM Array(x) = NumOfItems + 1 - x
                                ' Initially inversely sorted (I)
0016     REM READ Array(x) ' A test sequence of 8 numbers
0017 NEXT x

0018 ' Ensures that timing starts at the
                                beginning of a new tick
0019 CurrentTick! = TIMER
0020 DO
0021     Start! = TIMER
0022 LOOP WHILE CurrentTick! = Start!

0023 CALL BubbleSort (Array())
0024 PRINT USING "Time: ####.##"; TIMER - Start!
0025 PRINT "Number of Items: "; NumOfItems
0026 PRINT "    Passes: "; Passes%
0027 PRINT "    Compares: "; Compares%
0028 PRINT "    Swaps: "; Swaps%
0029 PRINT

0030 CALL CheckForSorted (Array())
0031 NEXT Power

0032 DATA 5, 8, 6, 3, 6, 7, 1, 4

0100 SUB BubbleSort (Array())
0101 ' Compares and swaps (if necessary) two
                                adjacent numbers in a list.

0102     SecondLastValue = UBOUND (Array) - 1

0103     DO
0104         ' Passes% = Passes% + 1
0105         SwapOccurred = False ' Reset the swap flag.
0106         FOR x = 1 TO SecondLastValue
0107             ' Compares% = Compares% + 1
0108             IF Array(x) > Array(x + 1) THEN
0109                 SWAP Array(x), Array(x + 1)
0110                 ' Swaps% = Swaps% + 1
0111                 SwapOccurred = True
0112             END IF
0113         NEXT x
0114     LOOP WHILE SwapOccurred
0115 END SUB
```

Fig.3
Continued over

Cont'd from previous page

```
0200 SUB CheckForSorted (Array())
0201 ' If a list of numbers is not sorted then a swap
      will occur during this test.

0203 NumOfItems = UBOUND(Array)

0204 FOR x = 1 TO NumOfItems - 1
0205     IF Array(x) > Array(x + 1) THEN
0206         PRINT "NOT Sorted"
0207     EXIT FOR
0208     END IF
0209 NEXT x

0210 END SUB
```

Figure 3. A workbench to assess the performance of different sorting algorithms.

```
0001 DEFINT A-Z

0300 SUB ShellSort (Array())
0301 ' Jump equals the size of the offset between
      compared numbers in the list.

0302 NumOfItems = UBOUND(Array)
0303 Jump = NumOfItems

0304 DO WHILE Jump > 1
0305     Jump = Jump \ 2
0306     DO
0307         Passes% = Passes% + 1
0308         SwapOccurred = False
0309         FOR Upper = 1 TO NumOfItems - Jump
0310             Lower = Upper + Jump
0311             Compares% = Compares% + 1
0312             IF Array(Upper) > Array(Lower) THEN
0313                 SWAP Array(Upper), Array(Lower)
0314                 Swaps% = Swaps% + 1
0315                 SwapOccurred = True
0316             END IF
0317         NEXT Upper
0318     LOOP WHILE SwapOccurred
0319 LOOP

0320 END SUB
```

Figure 4. The BASIC code for a shell sort

Improving on the Shell sort

I found the following technique in a BBS message by R. A. Coates in the QuikBas echo on 8/3/93 with no explanation of its workings. He referred to it as the Shell-Metzger algorithm. It was modified from IBM 360 ASM language. I've rewritten it to remove the two GOTOs it contained

and to use the same nomenclature as the other algorithms in this article. See Figure 6.

Again you should add the ShellMetzger subprogram to SORTTEST.BAS and use `CALL ShellMetzger(Array())` in line 23.

Comparing Figure 7 to Figure 5 you can see that there's no wasted pass to move to the next jump interval after the first pass. Notice the extra compares and the extra exchange in Figure 7's Pass 2 compared to its equivalent pass in Figure 5 (Pass 3). In the Shell-Metzger sort, in pass 2, no funny business occurs after the first 2 swaps in this pass since Upper is too close to the top of the list for the expression "Upper = Upper - Jump" to be a positive number. However, after the 3rd swap, Upper moves up the list by the jump interval. The same thing occurs with the 4th swap as well. I believe the rationale behind this behaviour is "We've just swapped two characters. The value that has just been swapped to the new upper position may now also be smaller than the value that's an interval above it. So to save another pass, check out that possibility now."

Because extra activity can occur in a pass, the number of passes in the Shell-Metzger and in other more complex sorts no longer has much significance and it won't be used again here. The number of swaps is still an important statistic. As Figure 1 shows this sort is a very good performer.

Recursion and Stack Space

Before we examine the Quicksort Algorithm, we need to know a little about recursion. A recursive operation is when a function or subprogram calls itself. The classic example would be determining the factorial of a number. Mathematically this task is shown as:

$$n! = n * (n-1) * (n-2) * \dots * 2 * 1$$

For example:

$$5! = 5 * 4 * 3 * 2 * 1$$

$$4! = 4 * 3 * 2 * 1$$

It's possible to restate the factorial of 5 as:

$$5! = 5 * 4!$$

$$5! = 5 * 4 * 3!$$

$$5! = 5 * 4 * 3 * 2!$$

$$5! = 5 * 4 * 3 * 2 * 1$$

You should be able to see now that we could calculate 5! by repeatedly having a factorial procedure reinvoked itself at a lower level until we reach the special case where the last operand is 1.

Figure 8 shows a QBASIC factorial implementation. It also keeps track of stack space usage. The "FRE (-2)" function returns the lowest amount of free stack

SHELL SORT

Pass 1, Jump=4

El	Num	U=1	U=2	Sw	U=3	Sw	U=4
1.	5	U		⑤		5	
2.	8		U	7		⑦	
3.	6			6	U	1	
4.	3			3		3	U
5.	6	L		⑥		6	
6.	7		L	8		⑧	
7.	1			1	L	6	
8.	4			4		4	L

Pass 2, Jump=4

El	Num	U=1	U=2	U=3	U=4
1.	5	U			
2.	8		U		
3.	6			U	
4.	3				U
5.	6	L			
6.	7		L		
7.	1			L	
8.	4				L

Pass 3, Jump=2

El	Num	U=1	Sw	U=2	Sw	U=3	U=4	U=5	U=6	Sw
1.	5	U	①		1					1
2.	7		7	U	③					3
3.	1	L	⑤		5	U				5
4.	3		3	L	⑦		U			7
5.	6		6		6	L		U		6
6.	8		8		8		L		U	④
7.	6		6		6			L		6
8.	4		4		4				L	⑧

Pass 6, Jump=1

El	Num	U=1
1.	1	U
2.	3	L
3.	5	
4.	4	
5.	6	
6.	4	
7.	6	
8.	8	

El Array Element Subscript Number
 Num Value (stored in Array) to be sorted
 U Upper Variable
 L Lower Variable
 Jump Offset between Upper & Lower
 U=1 Value of Upper
 Sw A swap has occurred. The new order is redisplayed.

Figure 5. The first 3 passes through the sample set. Also shown is the start of the 6th pass at which stage (Jump=1) the program has reverted to performing the same operations as a bubble sort.

space that was available at any previous stage of a program's execution, not necessarily what is currently available, so it is a "worst-case" figure. It shows quite clearly that each recursive invocation consumes stack space. The reason for this is that each call suspends execution of the previous recursive call. The memory address of the variables from the calling program and the memory address of the calling ("suspended") procedure have to be preserved so that, when the called program ends, execution will correctly recommence at the prior level. Also memory space for local variables in the suspended procedure (such as a local loop-counter variable) have to be preserved between calls.

Figure6 (right). The BASIC code for a Shell-Metzger sort

```

0001 DEFINT A-Z
0002 DECLARE SUB ShellMetzger (Array())

0400 SUB ShellMetzger (Array())
0401 NumOfItems = UBOUND(Array)
0402 Jump = NumOfItems
0403 DO WHILE Jump
0404   Jump = Jump \ 2
0405   Passes% = Passes% + 1
0406   FOR x = 1 TO NumOfItems - Jump
0407     Upper = x
0408     DO
0409       Lower = Upper + Jump
0410       Compares% = Compares% + 1
0411       IF Array(Upper) <= Array(Lower) THEN
0412         EXIT DO
0413       ELSE
0414         Swaps% = Swaps% + 1
0415         SWAP Array(Upper), Array(Lower)
0416         Upper = Upper - Jump
0417       END IF
0418     LOOP WHILE Upper > 0
0419   NEXT x
0420 LOOP
0421 END SUB
  
```

SHELL-METZGER SORT

Pass 1, Jump=4

El	Num	U=1	U=2	Sw	U=3	Sw	U=4
1.	5	U		5		5	
2.	8		U	⑦		7	
3.	6			6	U	③	
4.	3			3		3	U
5.	6	L		6		6	
6.	7		L	⑧		8	
7.	1			1	L	⑥	
8.	4			4		4	L

Pass 2, Jump=2

El	Num	U=1	Sw	U=2	Sw	U=3	U=4	U=5	U=6	Sw	U=4	Sw	U=2
1.	5	U	①		1					1		1	
2.	7		7	U	③					3		3	U
3.	1	L	⑤		5	U				5		5	
4.	3		3	L	⑦		U			7	U	④	L
5.	6		6		6	L		U		6		6	
6.	8		8		8		L		U	④	L	⑦	
7.	6		6		6			L		6		6	
8.	4		4		4				L	⑧		8	

Figure 7. The Shell-Metzger sorting algorithm in operation.

```

0001  ` FACTOR_R.BAS - demonstrates the use of recursion
        to determine a factorial.
0002  DEFINIT A-Z
0003  DECLARE FUNCTION Factorial (n)

0004  CLS
0005  PRINT Factorial(5)
0006  PRINT "Minimum stack space reached
        during function: "; FRE(-2)

0100  FUNCTION Factorial (n)
0101  STATIC Recurse

0102  IF n <= 0 THEN EXIT FUNCTION

0103  IF n = 1 THEN
0104      Factorial = 1      ` The special case
0105  ELSE
0106      Recurse = Recurse + 1
0107      PRINT "Minimum stack space available before ";
        Recurse;" recurse was:"; FRE(-2)
0108      Factorial = n * Factorial(n - 1)
0109  END IF

0110  END FUNCTION

```

Figure 8. Showing the use of recursion to determine a factorial number

This is done by placing the address of their memory location (knowing a variable's memory address is equivalent to knowing its value) on the stack. The stack is a Last-In/First-Out (LIFO) data storage structure that is analogous to a stack of plates with the address of a variable's location written on each plate. Earlier variables' locations are temporarily stored by tossing new plates on the stack as the recursive operation dives lower and lower. Finally the stack of "plates" reaches its greatest height (since the top of the stack is maintained at the same position it is actually the greatest "depth") when the special case of "multiply by 1" (in this example) is reached.

The operation of adding a "plate" to the stack is referred to as a "Push", and retrieving it later "Pops" it off the top of the stack.

In our factorial example, returning from the maximum recursive depth, lower levels of Factorial invocation return, first 1, then 2 ("2 * 1"), then 6 ("3 * 2 * 1") and so on. So it is the returning operation that progressively determines the final factorial value, not so much the calling procedures which were being constantly suspended until a lower level's value was resolved.

The QuickSort Algorithm

This method takes a list of numbers and selects a pivot point about midway in the list. This “pivot” is then in its final sorted position because all lower values are moved before it in the sequence and all higher values are moved later in the list. So the pivot splits the list of values into two new lists. Each of these new lists (“partitions”) is then split in two with a new pivot value for each division and so on until there are only either two ordered elements in a division or just a single element left in a division. At this stage the full list is sorted.

The list of numbers is best visualised as a horizontal sequence. Consider the Array() list. To indicate subscript numbers we’ll add full stops after them:

1. 2. 3. 4. 5. 6. 7. 8.
5 8 6 3 6 7 1 4

If the first value in the array is expressed as Array(Left) and the last value is Array(Right) then the midpoint (using integer division) is $\text{Array}((\text{Left} + \text{Right}) \backslash 2) = \text{Array}((1 + 8) \backslash 2) = \text{Array}(4)$. The value of this pivotal array subscript is “3”.

After partitioning and moving we end up with:

Below	Pivot	Above
1.	2.	3. 4. 5. 6. 7. 8.
1	3	6 4 6 7 5 8

Repartitioning of the “Below” partition is not necessary since it only contains one value. The midpoint for what was previously the “Above” partition is $\text{Array}(11 \backslash 2) = \text{Array}(5)$ which has a value of 6. And so on. Recursively, what is required is that the new bounds of a partition (“Left” & “Right”) are supplied to each new invocation of the QuickSort algorithm.

We’ll work at developing an understanding of the QuickSort algorithm through looking at it in various ways. First off, we’ll consider the commencement of initial QuickSort procedure and the start of each subsequent recursive invocation. Refer to Figure 9.

The method of deriving this information will be presented shortly. At this stage, please accept it as is. The initial level (Level 0 - no recursion has occurred yet) has Left/Right bounds of elements 1 & 8 respectively. This is shown as “(1,8)”.

The first level of recursion moves initially to check out the partition of L/R bounds

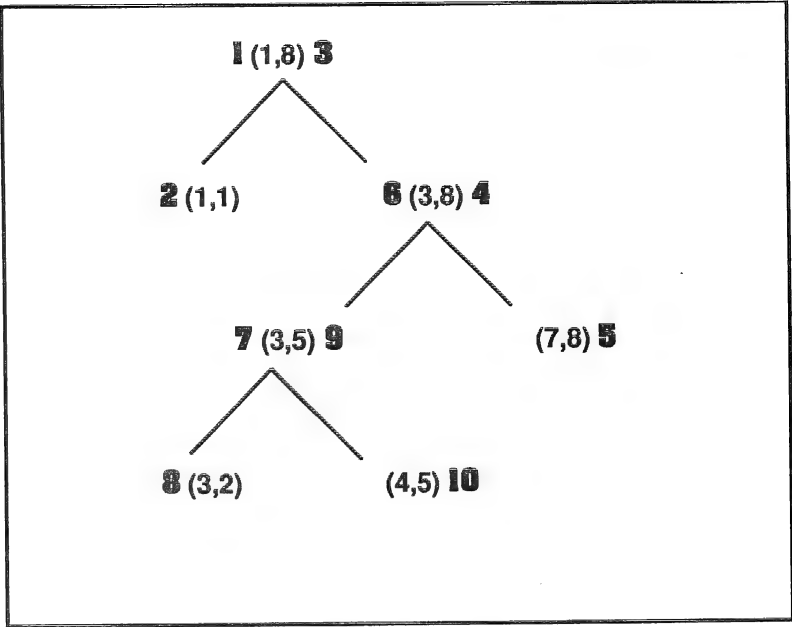


Figure 9. Left/Right partition bounds and execution order for the Quicksort program shown in Figure 10. Numbers in brackets are the the L/R partition subscript numbers NOT the values they hold. Values outside brackets represent the execution order in which partitions are visited.

```
0001 DEFINT A-Z
0002 ` QSORT_R.BAS - to investigate the operation of a
                        recursive QuickSort.
0003 ` The QuickSort subprogram is based on the one in
                        SORTDEMO.BAS that comes with QuickBASIC
                        v4.5. QSORT_R's performance has been
                        greatly improved by moving lines 227-228
                        to their current positions.
0006 ` In the original design they were situated after
                        line 235.

0007 DECLARE SUB Display (Array%(), Left%, Right%,
                        Reason$)
0008 DECLARE SUB QuickSort (Array(), Left%, Right%)

0009 DIM Array(1 TO 8)
                        ` The array of numbers to be sorted.
0010 DIM SHARED PreviousLineup(1 TO 8)
                        ` Only needed for display purposes.

0011 CLS

0012 FOR X = 1 TO 8
0013     READ Array(X)
0014     PreviousLineup(X) = Array(X)
                        ` The two arrays are made the same.
0015 NEXT

0016 CALL QuickSort(Array(), 1, 8)
                        ` Start sorting with the whole list of 8 nums.

0017 DATA 5, 8, 6, 3, 6, 7, 1, 4
```

Figure 10 - Continued over

(1,1). Evaluation of this partition is given precedence over the other partition at this level (3,8) because it ends up using less stack space to process the partition with the smaller span first. (1,1) is a straightforward situation - no swapping is required.

The processing of (3,8) produces a lower level of recursion. Partitions (3,5) & (7,8) are the result. Again, (7,8) with its span of 2 values takes evaluational precedence over (3,5) to conserve stack space. When a partition gets down to two numbers, as in the case of (7,8) we have reached the end of this particular line. The left number is checked to see if it is less than the right number and swapped if necessary. This is what happens with (7,8) because Array(7) = 8 and Array(8) = 7 (the correspondence of these values with these array subscript numbers is a coincidence) so the values of 8 & 7 are swapped.

A third level of recursion is required to finish processing this list of 8 numbers. (3,5) splits up into (3,2) & (4,5). Concerning (3,2), as you will see, the Left bound must be smaller than the Right bound. If they aren't it means that processing has overlapped into what is already sorted and can be halted for this particular branch. We know that the end is neigh because all that remains is (4,5). The two numbers in this partition (5 & 6) are checked to see if the first is greater than the second and swapped if necessary. The sorting is finished.

The level of recursion reached with mid-point partitioning should approximate to Log-to-the-base-of-2 of the number of items. This can be determined in the Immediate window:

```
? LOG(8) / LOG(2)
```

"3" is the answer. With 10,000 numbers the result is 13.3. Round this up to 14.

Figure 10 presents QSORT_R.BAS and Figure 11 shows the screen output when the test sequence is sorted. The initial display in each section is when the procedure is started (or restarted when recursion commences). Subsequent displays in a section mean that a swap has occurred. The two values that have been swapped will appear in a different colour, as will the partition being processed. The reason for the swap, relating to commented sections in Figure 10, is shown. Note that there are only 9 swaps compared to 17 if a Bubble sort was performed on this array. This difference rapidly increases as the number of items grows.

Figure 10 -Continued

```
0100 SUB Display (Array(), Left, Right, Reason$)
0101 ' Used to display the Array's contents. Only the
      elements within the bounds of any recursive
      call will be coloured to indicate the extent
      of that particular call's operation. Swaps
      are shown in another colour.

0104
0105 PRINT TAB(19);
0106 FOR Num = 1 TO 8
0107 IF (Num >= Left AND Num <= Right) OR
      (Num >= Right AND Num <= Left) THEN
0108     IF Array(Num) <> PreviousLineup(Num) THEN
          ' A swap has occurred.
0109         PreviousLineup(Num) = Array(Num)
          ' Resync the 2 arrays.
0110         COLOR 6
          ' Use a different colour to indicate the swap.
0111     ELSE
0112         COLOR 14 ' Value has not been swapped.
0113     END IF
0114 END IF
0115 PRINT Array(Num);
0116 COLOR 7
0117 NEXT Num
0118 PRINT TAB(45); "Reason: "; Reason$

0119 END SUB

0200 SUB QuickSort (Array(), Left, Right)
0201 ' QuickSort (recursive) works by picking a
      midway pivot point in Array, then moving
      every element that is bigger than the pivot
      point's value to one side of the pivot, and
      every element that is smaller to the other
      side.

0206 ' QuickSort is then called recursively for the
      two subdivisions ("partitions") created by
      the pivot.

0209 ' Recursion stops when there only two elements
      in a partition. The correct order of these
      two elements is then determined. This part
      of the list is now sorted. When all 2-
      element partitions are processed the array
      is sorted.

0214 ' The next two lines and any later calls to the
      Display subprogram are included for display
      purposes only.
0216 PRINT : PRINT TAB(1); "Array ("; Left; ", ";
      Right; "): ";
0217 CALL Display(Array(), Left, Right, "Start of
      procedure")

0218 IF Left < Right THEN
0219     IF Right - Left = 1 THEN
0220 ' Only two elements in this subdivision. Swap
          them if they are out of order and then end
          recursive calls for this branch.
0222         IF Array(Left) > Array(Right) THEN
0223             SWAP Array(Left), Array(Right)
0224             CALL Display(Array(), Left, Right,
                  "Only 2 values out of order")

0225         END IF
0226     ELSE
```

Figure 10 - Continued over

We'll now examine the operation with the initial partition of (1,8). Set a breakpoint (press F9) on line 218 of Figure 10, check out the display (press F4) and then single-step, bypassing lower subprogram execution (pressing F10).

In the following discussion it is important to recognise whether we are considering array subscript numbers or comparing the values they contain.

The first test (line 218) is to see if the Left subscript is less than the Right subscript. In this test sequence this condition only occurs at the third recursive level when we have (3,2) as the Left/Right bounds. When this condition occurs processing ceases for this branch.

The next test (line 219) checks whether the subscripts are adjacent and if so does a simple comparison, swaps them if necessary and ends up at line 262 to end this recurse. In our test sequence this ends the processing of the (7,8) recurse.

Here is our initial sequence:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	3	6	7	1	4
			P				

If the first 2 tests are passed we reach line 226 where the main part of the procedure commences. As was explained previously the midpoint for the partition is Array(4) which has a value of 3. Once this value is determined it is swapped with Right to act as the new Right bound (line 233). Here's the sequence after the swap.

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	4	6	7	1	3
			Sw				Sw

A DO loop (lines 235-249) then commences that concerns two position pointers, I & J. Initially they are set to Left and Right:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	4	6	7	1	3
I							J

Other DO loops (lines 237-239 & 240-242) move I & J towards each other.

Line 237 means "Do while the I & J subscripts (I here is moving towards J) haven't meet yet and while the value of the Ith element is less than or equal to 3". For the first value of Array(I) = 5, this loop does not execute.

Figure 10 continued

```
0227 I = Left
0228 J = Right
0229
0230 ` Pick a pivot point in the middle and then move it
    to the end:
0231 PivotPoint = (Left + Right) \ 2
0232 PivotPointValue = Array(PivotPoint)
0233 SWAP Array(PivotPoint), Array(Right)
0234 CALL Display(Array(), Left, Right, "Pivot point
    moved to end")

0235 DO
0236 ` Move in from both sides towards the pivot
    element:
0237 DO WHILE (I < J) AND (Array(I) <= PivotPointValue)
0238     I = I + 1
0239 LOOP
0240 DO WHILE (J > I) AND (Array(J) >= PivotPointValue)
0241     J = J - 1
0242 LOOP

0243     ` If we haven't reached the pivot point, it
        means that two elements on either side are out
        of order, so swap them:
0245 IF I < J THEN
0246     SWAP Array(I), Array(J)
0247     CALL Display(Array(), Left, Right,
        "Pivot point not reached")
0248 END IF
0249 LOOP WHILE I < J

0250 ` Move the pivot element back to its proper place
    in the array:
0251 SWAP Array(I), Array(Right)
0252 CALL Display(Array(), Left, Right,
    "Reposition pivot point")

0253 ` Recursively call the QuickSort procedure (pass
    the smaller partition first to use less stack
    space):
0255 IF (I - Left) < (Right - I) THEN
0256     CALL QuickSort(Array(), Left, I - 1)
0257     CALL QuickSort(Array(), I + 1, Right)
0258 ELSE
0259     CALL QuickSort(Array(), I + 1, Right)
0260     CALL QuickSort(Array(), Left, I - 1)
0261 END IF
0262 END IF
0263 END IF

0264 END SUB
```

Figure 10. A recursive implementation of the Quicksort algorithm.

The J loop is now reached. Line 240 means "Do while the J subscript hasn't reached the I subscript (J is moving to the left) and while the value of the J subscript is greater than or equal to 3". In this case, Array(J) = 8 and Array(8) = 3 so the conditional test becomes:

(8 > 1) AND (3 >= 3)

This is True so the loop executes and J decrements to 7:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	4	6	7	1	3
						I	J

This time the test is:

(7 > 1) AND (1 >= 3)

This is False so execution moves to line 245 where the test is:

1 < 7

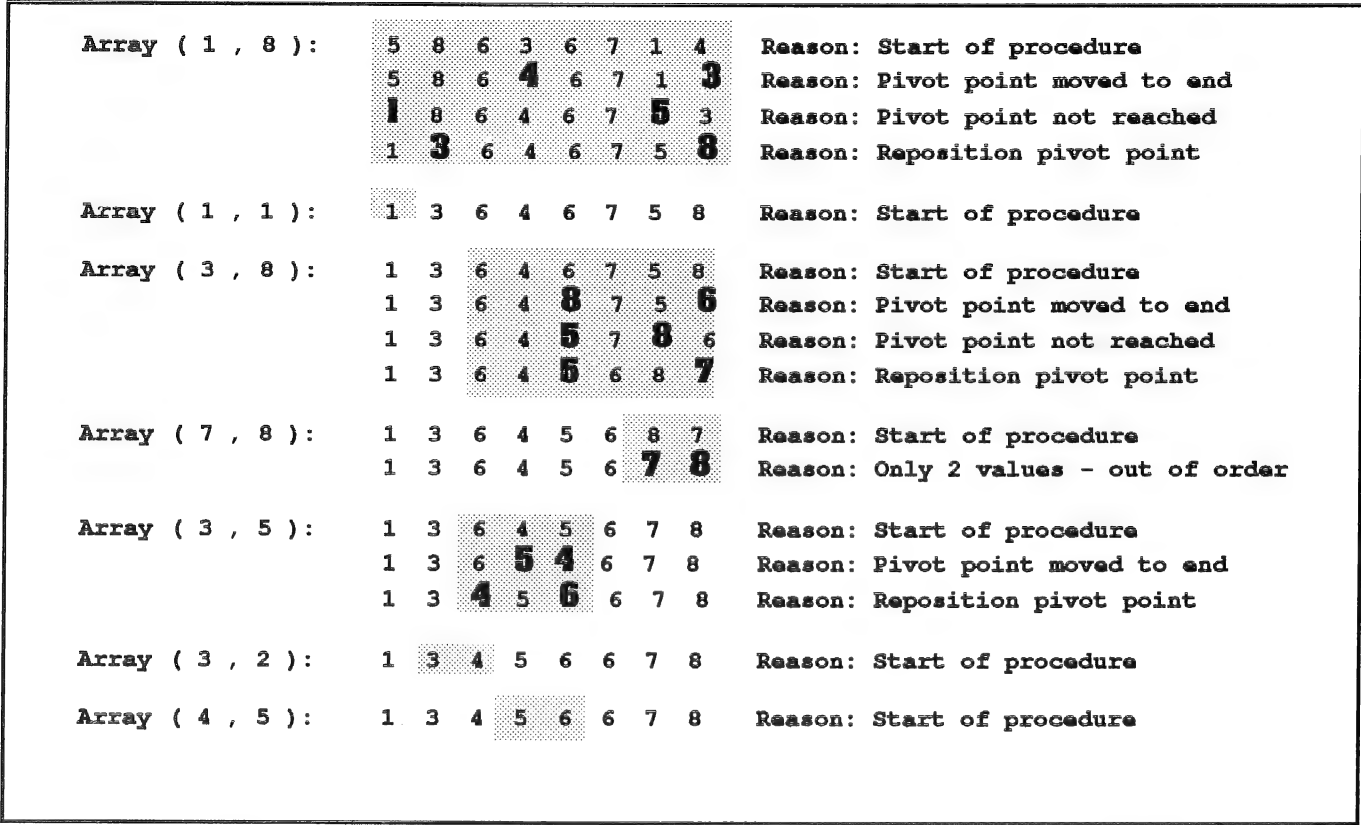


Figure 11. The portion of the test sequence being processed at the beginning of each invocation/reinvocation of the Quicksort program. If there are additional lines shown, this indicates that a swap has occurred in this partition. Shading and font size are used to indicate the extent of the partition and the items that have just been swapped.

This is True so a swap is performed. Let's see why the comments in lines 243-244 apply. The I loop and the J loop were moving I & J to reach the value of the pivot (3). By line 245, these loops have ended so either:

- 1. The I and J subscripts are the same ie. they've met, or
- 2. The value of Array(I) is now greater the pivot value and the value of Array(J) is now less than the pivot value.

Line 245 tests for Condition 1 and since it isn't True we know that the value of Array(I) is greater than the pivot value and the value of Array (J) is less than the pivot. So we swap these two values to move them to their correct partitions. If you haven't followed this, study lines 237 & 240 again and notice how the current value of Array(I) = 5 is greater than 3 and how the current value of Array(J) = 1 is less than 3. See below for the new sequence:

```
L   PivotValue=3   R
1. 2. 3. 4. 5. 6. 7. 8.
1 8 6 4 6 7 5 3
Sw                               Sw
```

You should be able to grasp now that the

I Loop chucks out the first value it finds that does not belong in the Below partition while the J loop is the guardian of Above partition.

We've now reached the ending check for the outermost DO loop (line 249). The subscript I is still less then the subscript J because they haven't meet so we go back to line 237. Left and Right haven't changed so I & J become:

```
L   PivotValue=3   R
1. 2. 3. 4. 5. 6. 7. 8.
1 8 6 4 6 7 5 3
I                               J
```

This time, in the I loop section, I is incremented once because 1 < 3 is True but 8 > 3 isn't. So I, the keeper of the Below partition, has found an intruder in the Array(2) position:

```
L   PivotValue=3   R
1. 2. 3. 4. 5. 6. 7. 8.
1 8 6 4 6 7 5 3
I                               J
```

In the J loop section, J keeps moving to the left because it doesn't find a value that is less than the pivot value of 3. This move-

ment continues until J reaches the Array(2) position which makes the test in line 240 False. This ends the J loop:

```
L   PivotValue=3   R
1. 2. 3. 4. 5. 6. 7. 8.
1 8 6 4 6 7 5 3
I,J
```

Line 245 is now False so no swap occurs and the test in line 249 is also False so the main DO loop ends.

Line 251 repositions the pivot value by swapping its Right position with the meeting point. See below:

```
L   PivotValue=3   R
1. 2. 3. 4. 5. 6. 7. 8.
1 3 6 4 6 7 5 8
Sw                               Sw
```

We can now be confident that the numbers on either side of Array(2) = 3 are now in their correct partitions since:

- 1. The I loop found no intruder below Array(2).
- 2. The J loop found no value less than or equal to 3 but instead was ended by colliding with I.

3. The swapping of Array(2) and Array(Right) when the pivot was repositioned has not affected the validity of partitioning since we know that the I loop saw the former value of Array(2)=8 as an intruder and since we know that the former value of Array(Right) was the pivot value itself.

So we've achieved our immediate goal of partitioning the values into Below, Pivot and Above. We've exhausted the algorithm at this Left-Right span so it's time to process the two new partitions. Line 255 compares the size of the spans of the Below and Above partitions and ensures that the smaller of the two is recursively called first to conserve stack space. In this case, in lines 256-257, we end up launching 2 first-level recursions with Left/Right subscript bounds of (1,1) and (3,8).

A Non-Recursive QuickSort

In many cases recursion is not the best way to perform an operation. Take the Factorial example again. Figure 12 shows how this would be implemented with iteration (looping) instead of recursion. The use of the STATIC attribute with the function, although not strictly necessary, uses a little less stack space. Compare the amount of stack usage of the iterative version with the recursive one. Recursion is also slower than a non-recursive counterpart.

Let's examine a non-recursive implementation of the QuickSort algorithm. Consider the QSORT subprogram in Figure 13 which is designed to add to the program in Figure 10, and Figure 14, the display it produces.

Here is the original setup with the initial pivot point:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	3	6	7	1	4
I			P				J

After the I & J loops have finished we have:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
5	8	6	3	6	7	1	4
I			P			J	

The first swap (line 329):

L							R
1.	2.	3.	4.	5.	6.	7.	8.
1	8	6	3	6	7	5	4
Sw			P			Sw	

```

0001  ' FACTOR I.BAS - demonstrates the use of
        iteration to determine a factorial.
0002  DEFINT A-Z
0003  DECLARE FUNCTION Factorial (n)

0004  CLS
0005  PRINT Factorial(5)
0006  PRINT "Minimum stack space reached during
        function: "; FRE(-2)

0100  FUNCTION Factorial (n) STATIC
0101  Temp = 1

0102  FOR Num = 1 TO n
0103      Temp = Temp * (Num)
0104  NEXT Num

0105  Factorial = Temp
0106  PRINT "Minimum stack space available before ";
        Recurse; " recurse was:"; FRE(-2)
0107  END FUNCTION

```

Figure 12. Using iteration, instead of recursion, to determine a factorial.

```

0300  SUB QSort (Array()) STATIC
0301  ' An iterative (non-recursive) implementation
        of the Quicksort algorithm. Based on
        QSORT.BAS in BASIC Techniques and
        Utilities by Ethan Winer, Ziff-Davis
        Press, 1991.

0304  NumOfItems = UBOUND(Array)
0305  REDIM TempStack((NumOfItems \ 5) + 10)
        ' Create an array for use as a stack

0306  Left = 1
0307  Right = NumOfItems

0308  DO
0309      DO
0310          PivotPointValue = Array((Right + Left) \ 2)
                ' Seek midpoint
0311          I = Left
0312          J = Right
0313          PRINT : PRINT TAB(1);
                "Array ("; Left; ", "; Right; "): ";
0314          CALL Display(Array(), Left, Right,
                "Start of iteration")

0315          DO
0316              DO WHILE Array(I) < PivotPointValue
0317                  I = I + 1
0318              LOOP
0319              DO WHILE Array(J) > PivotPointValue
0320                  J = J - 1
0321              LOOP
0322
0323              ' If I & J have crossed over then end
                this level.
0324              IF I > J THEN EXIT DO
0325
0326              ' If we haven't reached the pivot point, it
                means that the two elements on either side
                are out of order, so swap them.

```

Figure 13. Continued over

Figure 13 continued

```

0328     IF I < J THEN
0329         SWAP Array(I), Array(J)
0330         Swaps% = Swaps% + 1
0331         CALL Display(Array(), Left, Right, "I < J")
0332     END IF
0333
0334     I = I + 1
0335     J = J - 1
0336     LOOP WHILE I <= J

0337     IF I < Right THEN      ' Finished at this level
0338         TempStack(StackPtr) = I ' Push I
0339         TempStack(StackPtr + 1) = Right 'Push Right
0340         StackPtr = StackPtr + 2
0341     END IF

0342     Right = J
0343     LOOP WHILE Left < Right

0344     IF StackPtr = 0 THEN EXIT DO
        ' No nodes left to process
0345     StackPtr = StackPtr - 2
0346     Left = TempStack(StackPtr)      ' Pop Left
0347     Right = TempStack(StackPtr + 1) ' Pop Right
0348     LOOP

0349     ERASE TempStack      ' Delete the stack array

0350     END SUB

```

Lines 334 & 335 move I & J closer together and then line 336 loops back to line 315:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
1	8	6	3	6	7	5	4
	I		P		J		

This time the I & J loops produce:

L							R
1.	2.	3.	4.	5.	6.	7.	8.
1	8	6	3	6	7	5	4
	I		P, J				

The second swap:

L	PivotValue=3						R
1.	2.	3.	4.	5.	6.	7.	8.
1	3	6	8	6	7	5	4
	Sw		Sw				

Another I & J move from lines 334 & 335 occurs and the loop goes back to line 315:

L	PivotValue=3						R
1.	2.	3.	4.	5.	6.	7.	8.
1	3	6	8	6	7	5	4
			I, J				

After the next I & J loop traversals:

L	PivotValue=3						R
1.	2.	3.	4.	5.	6.	7.	8.
1	3	6	8	6	7	5	4
			J			I	

Line 336 is now False so a breakout from the loop between lines 315-336 occurs. Processing at this level is finished. In a

Figure 13. A non-recursive implementation of QuickSort.

Array (1 , 8):	5 8 6 3 6 7 1 4 1 8 6 3 6 7 5 4 1 3 6 8 6 7 5 4	Reason: Start of iteration Reason: I < J Reason: I < J
Array (1 , 2):	1 3 6 8 6 7 5 4	Reason: Start of iteration
Array (3 , 8):	1 3 6 8 6 7 5 4 1 3 4 8 6 7 5 6 1 3 4 5 6 7 8 6	Reason: Start of iteration Reason: I < J Reason: I < J
Array (3 , 4):	1 3 4 5 6 7 8 6	Reason: Start of iteration
Array (6 , 8):	1 3 4 5 6 7 8 6 1 3 4 5 6 7 6 8	Reason: Start of iteration Reason: I < J
Array (6 , 7):	1 3 4 5 6 7 6 8 1 3 4 5 6 6 7 8	Reason: Start of iteration Reason: I < J

Figure 14. The display produced by the QSORT program

recursive version, operation at this level would be suspended while recursive calls to the next two partitions occurred. In this non-recursive version we need to store significant parameters (here the current values of I & Right). We do this by "pushing" their value on to our "stack" and then adjusting the "stack pointer":

```
StackPtr=2 ->
               8 (was Right)
               3 (was I)
```

Now we alter the Right position to the current J position and line 341 loops back to line 309:

```
L R PivotValue=1
1. 2. 3. 4. 5. 6. 7. 8.
1 3 6 8 6 7 5 4
I J
```

The I & J loops produce:

```
L R PivotValue=1
1. 2. 3. 4. 5. 6. 7. 8.
1 3 6 8 6 7 5 4
I,J
```

After lines 334 & 335:

```
L R PivotValue=1
1. 2. 3. 4. 5. 6. 7. 8.
1 3 6 8 6 7 5 4
I
J=0
```

Line 336 is False again so this partition's processing is finished. Since I has reached Right there is no need to split & reprocess

this node further. So no push occurs this time in lines 337-341.

Right becomes 0 and the end-of-loop test in line 343 fails. This causes operation to escape to the outer DO loop (lines 308-348) where, since the stack point is not zero ie. there is something stored on the stack, two pops occur. These pops set the Left/Right bounds for the next branch traversal:

L				R			
1.	2.	3.	4.	5.	6.	7.	8.
1	3	6	8	6	7	5	4
I				J			

At this stage the stack pointer has been reset to zero so, unless further pushes occur (and they do), line 342 will then end the sort.

Figure 15 shows the partition "tree" structure for this version.

Due to the small size of our test sequence, the maximum number of values on the stack never exceeds 2. However, if the list was larger, more values would need to be stored since the branches of the tree would be more complex. To see an example of this, add an extra number to the end of the 8-number test sequence (following line numbers refer to Figure 10):

```
0023 DATA 5, 8, 6, 3, 6, 7,
      1, 4, 9
```

Alter the number of elements to be read

into the array:

```
0007 NumEls = 9
In the Display subprogram alter the PRINT
TAB value from (45) to (48) and expand
the Num FOR loop to 1 TO 9.
```

(The following line numbers refer to Figure 13.) Add the following lines after line 340:

```
0340a PRINT TAB(48); "Stack
      after Push:";
0340b
      FOR SP = 0 to StackPtr - 1
0340c PRINT TempStack(SP);
0340d NEXT SP
0340e PRINT
```

And add the following lines after line 347:

```
0347a PRINT TAB(48);
      "Stack after Pop:";
0347b IF StackPtr > 0 THEN
0347c   FOR SP = 0 to
      StackPtr - 1
0347d PRINT TempStack(SP);
0347e   NEXT SP
0347f   PRINT
0347g ELSE
0347h   PRINT " Empty"
0347i END IF
```

Figure 16 shows the tree structure of this sort while Figure 17 gives the screen display with the extra stack information. Just considering the left branch of Figure 15 you can see that prior to processing (1,4) the corresponding partition of the right branch (6,9) has to be "remembered for afterwards". A further level of

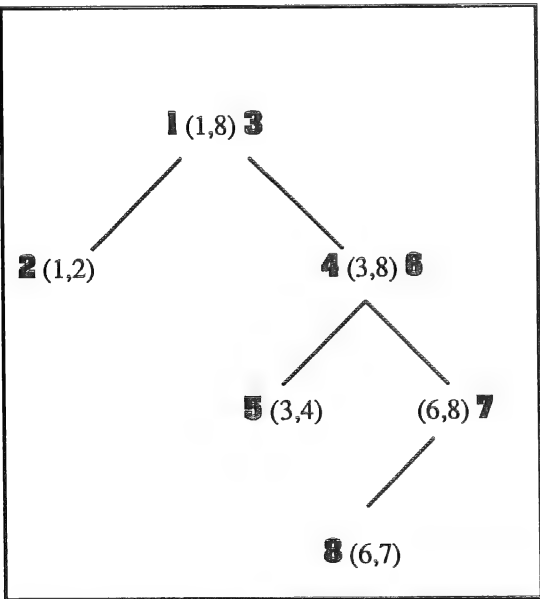


Figure 15. The partition bounds and execution order for the QSort subprogram.

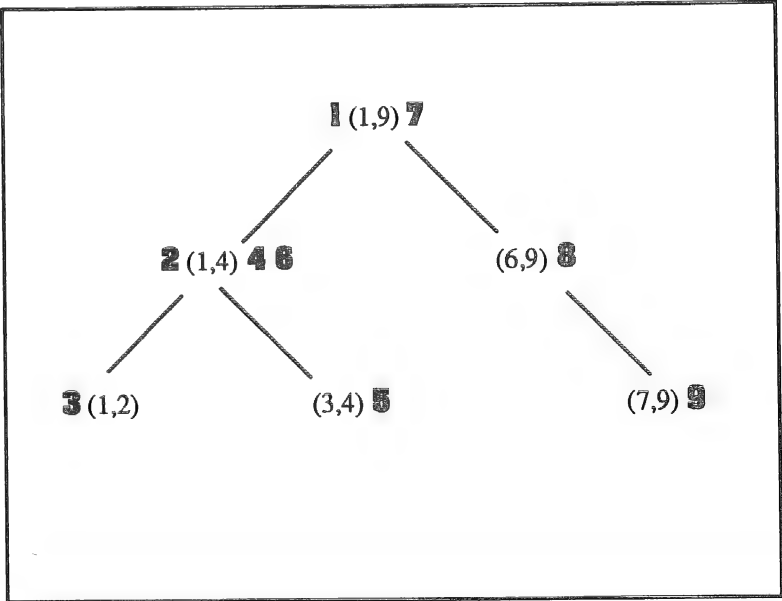


Figure 16. Tree structure and execution order for a nine number sort.

remembrance is required for (3,4) when (1,4) proceeds to (1,2). Once (1,2) is resolved (3,4) can be restored for processing next.

Conclusion

You should be able to see now the key to improved sorting performance is the ability to move out-of-order values relatively large distances in the list in a swap and hence reduce the total number of swaps performed.

There are a number of other different sorting algorithms that we haven't had space to consider here. Generally, the Quicksort algorithm provides the best balance of performance sorting unsorted, sorted and inversely sorted lists. There are a couple of enhancements we can use to increase Quicksort's performance even further and, if there's sufficient space next month, we'll look at these.

We haven't considered indexed sorting methods in this article. In a typical situation we may need to sort records in a database that each contain many different fields (similar to a large number of dimensions in an array). It is then easier to maintain a list of "pointers" in an index

which points to where the record (a multi-dimensional line in an array) is located in the database. We "sort" the database by shuffling the order of the pointers in the index file rather than attempting to manipulate the much larger database file. Changing the sort order (say from Surname-then-Christian Name to Membership Number) then involves nothing more than switching to another index file that is ordered using a different index expression. That topic will have to wait for a later article.

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Next month we'll add a sorting procedure to the QDIR directory-listing program. A fast assembly language method of performing 2-key sorts (eg. by-Extension-then-by-FileName) will also be presented.

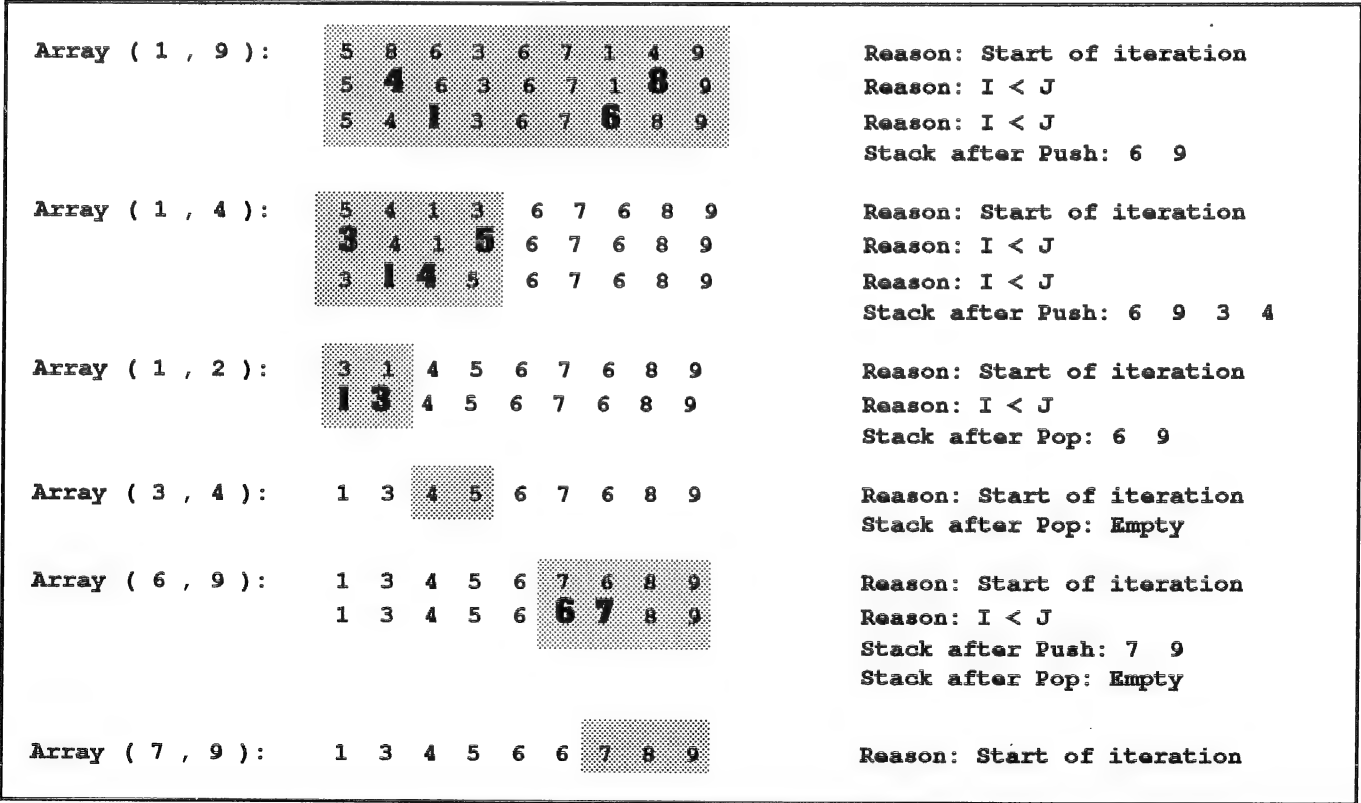


Figure 17. Showing the display produced when performing an iterative Quicksort on a nine-numeral test sequence with stack contents shown

Fonts and Microsoft "Windows"

Introduction

There is a good deal of misunderstanding about just what a font is. When most people talk about a font, they are really talking about a typeface. A typeface is a set of characters that share common characteristics such as stroke width and the presence or absence of serifs. For example, Arial and Courier are each typefaces. Frequently, both the typeface and its name are copyrighted by the typeface designer or manufacturer.

A font is the complete set of characters for one style of a specific typeface, including all the letters, numbers, and punctuation marks. For example, Courier New Bold Italic is a font. In Windows, a font family refers to a group of typefaces with similar characteristics. The families that Windows recognizes for font installation and mapping are Roman, Swiss, Modern, Script, and Decorative. For example, Arial, Arial Bold, Arial Bold Italic, Arial Italic, Small Fonts, and MS Sans Serif are all part of the sans serif Swiss font family.

For printing and display on a computer system, each font has its own character set according to ASCII, ANSI, OEM, or other industry standards that defines what character is represented by a specific key-stroke. Windows uses the ANSI character set. Many non-Windows applications use the ASCII character set.

Terminology of fonts

The following basic terms are used in Windows to define the appearance of fonts in an application:

Font *style* refers to specific characteristics of the font. The four characteristics you can define for fonts in Windows are italic, bold, bold italic, and roman (often called Normal or Regular in font dialog boxes).

Font *size* refers to the point size of a font, where a point is about 1/72 of an inch. Typical sizes for fonts in text are 10 points and 12 points.

Font *effects* refer to attributes such as underlining, strikethrough, and color that can be applied to text in many applications.

You may also encounter the following terms in descriptions of fonts and typefaces:

Pitch refers to the type size for fixed-width fonts, specified in characters per inch (cpi), where 10-pitch = 12-point, 12-pitch = 10-point, and 15-pitch = 8-point type.

Serif and *sans serif* describe specific characteristics of a typeface. Serif fonts, such as Times New Roman or Courier, have projections, or serifs, that extend from the upper and lower strokes of the letters. Sans serif fonts, such as Arial and MS Sans Serif, do not have serifs.

Slant refers to the angle of a font's characters, which can be italic (slanted) or roman (not slanted).

Spacing can be either fixed or proportional. In a fixed font such as Courier, every character occupies the same amount of space. In a proportional font such as Arial or Times New Roman, character width varies.

Weight refers to the heaviness of the stroke for a specific font, such as light, regular, book, demi, heavy, black, and extra bold.

Width refers to whether the standard typeface has been compressed or extended horizontally. The variations are condensed, normal, and expanded. X-height refers to the vertical size of lowercase characters.

Windows 3.1 Fonts

The Windows operating system version 3.1 provides three basic kinds of fonts, which are categorized according to how the fonts are rendered for screen or print output:

Raster fonts

Raster fonts are stored in files as bitmaps and are rendered as an array of dots for displaying on screen and printing on paper. Raster fonts cannot be scaled or rotated. Vector fonts are rendered from a mathematical model, where each character is defined as a set of lines drawn between points.

Vector fonts

Vector fonts can be scaled to any size or aspect ratio.

TrueType fonts

TrueType™ fonts are outline fonts using new technology available in Windows 3.1. They can be scaled and rotated. Besides the font-rendering mechanism, Windows fonts are described according to the output device:

Screen fonts are font descriptions that Windows uses to represent characters on display devices. Windows uses special raster fonts as the system screen font for menus, window captions, messages, and other text. A set of system, fixed, and OEM terminal fonts is shipped with Windows 3.1 to match your system's display capabilities (that is, CGA, EGA, VGA, or 8514 video displays). The default system screen font in Windows 3.1 is System, a proportionally spaced raster font. The installed screen fonts are listed in the [fonts] section of your WIN.INI file.

Some screen fonts are installed for displaying non-Windows applications when Windows is running in 386 enhanced mode. By default, code page 437 (U.S.) fonts are installed. Other screen font files are included for international language support, identified by the code page number appended to the filename.

Printer fonts are the font descriptions used by the printer to create a font. Windows applications can use three kinds of printer fonts: device fonts, downloadable soft fonts, and printable screen fonts.

Windows Raster Fonts

Raster fonts are bitmaps supplied in different sizes for specific video display resolutions. The Windows fonts MS Serif, MS Sans Serif, Courier, System, and Terminal are raster fonts. A raster font file contains data that describes all the characters and styles of a typeface for a specific display device. Windows provides several raster font sizes for various display devices. For example, MS Serif comes in point sizes 8, 10, 12, and 14 for CGA,

EGA, VGA, and 8514 display devices. Windows can scale raster fonts to even multiples of their supplied sizes. This means that MS Serif can be scaled to 16, 20, or 24 points, and so on. Bold, italic, underline, and strikethrough styles can also be generated from a standard raster font.

Normally, the correct font sets for your display and printer are installed by Windows Setup. Additional raster font sets can be installed with Control Panel. The following is a list of the raster fonts installed in Windows 3.1:

Font	Filename	Character Set
Courier	COURIER.FON	ANSI
MS Sans Serif	SSERIFx.FON	ANSI
MS Serif	SERIFx.FON	ANSI
Small	SMALLx.FON	ANSI
Symbol	SYMBOLx.FON	SYMBOL

The raster font sets for different display resolutions are distinguished by a letter suffix on the font name (represented as x in the previous table). To determine the file that Windows installs for a given display or printer, refer to the "Font Set" column of the following table and add to the character set filename the letter that identifies the resolution of the raster font. For example, the resource file for MS Serif fonts for VGA is named SERIFE.FON.

Raster fonts

Raster fonts can also be printed if their resolution and aspect ratio are close to what your printer requires. If you do not see raster fonts for your printer in a fonts dialog box, check your printer's horizontal and vertical resolution and compare it with the table above. If there is a close match, choose the Fonts icon in the Control Panel window and make sure the appropriate font set is installed. If there is no close match, you will not be able to print the Windows raster fonts on your printer. Some printer drivers cannot print

raster fonts, regardless of the aspect ratio. MS Serif and MS Sans Serif in Windows 3.1 replace the identical raster fonts Tms Rmn and Helv that were installed in earlier versions of Windows. Windows matches MS Serif to Tms Rmn and MS Sans Serif to Helv through the [FontSubstitutes] section of the WIN.INI file. The new Windows raster font named Small Font was designed for readable, efficient screen display of small fonts. For sizes

under 6 points, Small Font is a better choice for screen display than any TrueType font because it's easier to read.

Windows Vector Fonts

Vector fonts are a set of lines drawn between points, like a pen plotter drawing a set of characters. They can be scaled to virtually any size, but generally they do not look as good as raster fonts in the sizes that raster fonts are specifically designed for. Vector fonts are stored in Windows as collections of graphics device interface (GDI) calls and are time-consuming to generate but are useful for plotters and other devices where bitmapped characters can't be used. Some Windows applications automatically use vector fonts at larger sizes. These applications often allow you to specify at what point size you want to use vector fonts. For example, the "Vector Above" setting in Aldus PageMaker specifies the point size at which PageMaker will switch to vector fonts. The Windows fonts Roman, Modern, and Script are vector fonts.

TrueType and Windows 3.1

As mentioned earlier, Windows 3.1 includes a new implementation of outline font technology called TrueType. TrueType has many benefits over other kinds of Windows fonts: True WYSIWYG (what you see is what you get) display—what you see is really what you get because Windows uses the

Font Set	Output Device	Horizontal Resolution	Vertical Resolution	Aspect Ratio H:V
A	CGA display	96 dpi	48 dpi	2:1
B	EGA display	96 dpi	72 dpi	1.33:1
C	Printer	60 dpi	72 dpi	1:83
D	Printer	120 dpi	72 dpi	1.67:1
E	VGA display	96 dpi	96 dpi	1:1
F	8514 display	120 dpi	120 dpi	1:1

Raster Font sets installed with Microsoft Windows

same font for both the screen and printer. You don't have to think about whether you have a specific point size for a particular printer or for your display.

You can scale and rotate TrueType fonts, and they look good in all sizes and on all output devices that Windows supports.

Your document will look the same when printed on different printers, and any printer that uses the Windows 3.1 universal driver can print TrueType fonts.

Your document will look the same if you move it across platforms. For example, because the Macintosh uses the same TrueType font technology as IBM-compatible computers, the text you format in Microsoft Word for Windows will look the same if you open the document in Microsoft Word for the Macintosh.

Each TrueType typeface requires only an .FOT and a .TTF file to create fonts in all point sizes at all resolutions for all output devices. (Raster fonts need separate files for each point size, resolution, and display device.)

TrueType is integrated with the operating environment, so all Windows applications can use TrueType fonts without changes or upgrades, just as they use other Windows raster fonts.

The TrueType fonts installed with Windows 3.1 are Arial, Courier New, Times New Roman, and Symbol in regular, bold, bold italic, and italic.

How TrueType Works

TrueType fonts are stored as a collection of points and "hints" that define the character outlines. When a Windows application asks for a font, TrueType uses the outline and the hints to render a bitmap in the size requested. Hints are the algorithms that distort the scaled font outlines to improve how the bitmaps look at specific resolutions.

Each time you run Windows, the first time you select a TrueType font size, TrueType renders a bitmap of the selected characters for display or printing. Because of this, the initial font generation may be slower than with Windows raster fonts. However, Windows stores the rendered bitmaps in a font cache, so each subsequent time the font is used during that Windows session, display or printing will be just as fast as with a Windows raster font.

The Windows universal printer driver supports TrueType. Any printer that works with the universal printer driver will support TrueType automatically.

Using TrueType in Windows Applications

With TrueType, you have more choices for fonts in most Windows applications, plus the same fonts you had in earlier versions of Windows. In many applications, TrueType fonts appear in the fonts dialog box with a "TT" logo beside the typeface name. Typefaces that are device fonts have printer icons beside their names in the list.

You will also notice that you can specify any size you want for TrueType fonts, rather than choosing from a limited list of raster or vector font sizes.

To specify that you want to use TrueType fonts or restrict all choices to TrueType, choose the Fonts icon in the Control Panel window and choose the TrueType button. If you restrict all choices to TrueType, you will ensure that the type styles in your documents will print on any dot-matrix, Hewlett-Packard Printer Control Language (HPPCL), or PostScript printer and that your documents can be moved to other platforms easily.

Windows 3.1 does not automatically change fonts in documents that were produced with earlier font technologies. If you want to update old documents to use TrueType fonts, you must update them manually. You might also contact your application vendor to see if there are new utilities available that will assist in upgrading of documents to use TrueType.

Font Installation

In Windows 3.1, fonts can be installed on your system in several ways:

Windows installs TrueType and its screen fonts automatically during installation. When you specify a printer and other options in the Printer Setup dialog box, Windows includes information about font cartridges and built-in fonts for your printer.

Install more TrueType fonts from disks by choosing the Add Fonts button in the Font Installer dialog box.

Install more HPPCL soft fonts on your hard disk by installing the AutoFont

Support files and following the instructions for adding scalable printer fonts. Then choose the Add Fonts button in the Font Installer dialog box to install the fonts in Windows.

Install other third-party soft fonts on your hard disk by using the utility supplied by the manufacturer. Then choose the Add Fonts button in the Font Installer dialog box to install the fonts in Windows.

Install a new font cartridge in your printer, and choose the Printer icon in the Control Panel window. In the Setup dialog box, select a new item from the Cartridge list.

For more information about using the Font Installer, choose the Help button in the Font Installer dialog box.

How Windows Matches Fonts

When an application asks for characters to print or display, Windows must find the appropriate font among the fonts installed on your system. Finding the font can be complex because, for example, your document may contain fonts that aren't available on the current printer, or there may be more than one font with the same name installed on your system.

The basic rules that Windows uses for finding a font are:

1. If the font is a TrueType font, then TrueType renders the character, and the result is sent to the display or to the printer.
2. If the font is not a TrueType font, then Windows uses the font mapping table to determine the most appropriate device font to use.

Before TrueType, when Windows mapped fonts that had the same name, the order of the internal listing of fonts determined which font was chosen. In Windows 3.1, TrueType fonts are always chosen first, then the internal listing order is followed.

When Windows uses the font mapping table to match screen fonts to printer fonts, the characteristics used to find the closest match are, in descending order of importance: the character set, variable versus fixed pitch, family, typeface name, height, width, weight, slant, underline, and strikethrough.

The following table shows which types of Windows fonts can be printed on different kinds of printers:

Printer Type	Device Font	Raster Fonts	Vector Fonts	TrueType Fonts
Dot matrix	Yes	Yes	No	Yes
HPPCL	Yes	No	Yes	Yes
PostScript	Yes	No	Yes	Yes
Plotter	Yes	No	Yes	No

Printability of Windows fonts

The following table lists the character sets installed with Windows 3.1:

Font	Font Type	Spacing	Default Sizes
Arial Bold Italic	TrueType	Proportional	Scalable
Arial Bold	TrueType	Proportional	Scalable
Arial Italic	TrueType	Proportional	Scalable
Arial	TrueType	Proportional	Scalable
Courier New Bold Italic	TrueType	Fixed	Scalable
Courier New Bold	TrueType	Fixed	Scalable
Courier New Italic	TrueType	Fixed	Scalable
Courier New	TrueType	Fixed	Scalable
Courier	Raster	Fixed	10, 12, 15
Modern	Vector	Proportional	Scalable
MS Sans Serif	Raster	Proportional	8, 10, 12, 14, 18, 24
MS Serif	Raster	Proportional	8, 10, 12, 14, 18, 24
Roman	Vector	Proportional	Scalable
Script	Vector	Proportional	2, 4, 6
Symbol*	Raster	Proportional	8, 10, 12, 14, 18, 24
Symbol*	TrueType	Proportional	Scalable
System	Raster	Proportional	Display-dependent size
Terminal**	Raster	Fixed	Display-dependent size
Times New Roman Bold Italic	TrueType	Proportional	Scalable
Times New Roman Bold	TrueType	Proportional	Scalable
Times New Roman Italic	TrueType	Proportional	Scalable
Times New Roman	TrueType	Proportional	Scalable

* Symbol rather than ANSI character set

**OEM rather than ANSI character set

Disk Space, Memory Use, and Speed

You may notice a performance decrease if your document uses many fonts in many sizes. Rendering many fonts requires a large font cache, which might force more swapping to the hard disk. This same problem occurs with other fonts in earlier

versions of Windows. With TrueType, less memory is used for the cache than would be required for corresponding raster fonts; this should lead to a net performance gain. The font cache will use more memory with TrueType only if multiple logical fonts have been mapped to the same raster font. Usually, however, any additional swapping to disk is still faster

than discarding the rendered bitmaps.

For TrueType fonts, hard disk space is not the problem it can be for a comparative selection of raster fonts. This is because the font information files do not contain actual raster images of the fonts, but only outline and hint information. When you install Windows, however, you will see that more disk space is being used to store

fonts. This is because all Windows raster fonts are still shipped for backward compatibility with earlier applications. Any soft fonts you already have on your hard disk will not be affected by the installation of TrueType with Windows 3.1.

TrueType and Earlier Windows Applications

TrueType uses a different character spacing (called ABC widths) than is used for raster fonts. Applications that use this spacing will be able to space characters more accurately, especially in bold and italic text. However, because of this change in spacing, text can sometimes appear inaccurately in applications written for earlier versions of Windows. For example, the end of a highlighted text line may look odd on screen.

Most applications list font names on menus and in dialog boxes that match the names of fonts that can be printed on the current printer. So the change in font names for Windows 3.1 will probably not affect you. You will only see more choices in most fonts dialog boxes.

Note:

Windows 3.1 maps the typefaces Helvetica to Arial, Times to Times New Roman, and Courier to Courier New in the [FontSubstitutes] section of the WIN.INI file. You can change this section of the WIN.INI file to map any font names to other font names.

Printer Fonts and Windows 3.1

A printer font is any font that can be produced on your printer. There are three kinds of printer fonts:

Device fonts are fonts that actually reside in the hardware of your printer. They can be built into the printer itself, or can be provided by a font cartridge or font card.

Printable screen fonts are Windows screen fonts that can be translated for output to the printer.

Downloadable soft fonts are fonts that reside on your hard disk and are sent to the printer when needed. Not all printers can use all three types of printer fonts. Plotters, for example, cannot use downloadable soft fonts. HPPCL printers cannot print Windows screen fonts.

Character Sets for Printer Fonts

Windows uses the ANSI character set. Some printers, such as the IBM Proprietary, use the IBM (OEM) standard for codes above 128. Other printers might use their own proprietary set of extended character codes. To be sure you get the characters you want, consult your printer documentation to determine what character set is supported by the printer.

Windows 3.1 Character Map

You can also use the Windows Character Map to select and insert a special character in your document. When you insert a special character in a document to get a specific result in print, the character you see on the screen might not be correct because the character is displayed using the ANSI character set and the best matching screen font for the current printer font. However, the printed document will contain the correct character. Conversely, if you type an ANSI character that appears on screen but is not supported in the fonts your printer uses, some other character, such as a period, will be printed instead.

Dot-Matrix Printer Fonts

Dot-matrix printers support device fonts and printable screen fonts. Usually, a dot-matrix printer includes only a limited range of internal device fonts. Typically, fixed-spacing fonts are supplied in a variety of cpi sizes. Dot-matrix device fonts are conventionally named typeface xxCPI, where typeface is the typeface name, and xx is the number of characters per inch. Distinguishing a device font on a dot-matrix printer is usually as easy as checking for the CPI designation at the end of the font name, such as "Courier CPI 10."

Through the universal printer driver, dot-matrix printers can also support TrueType. When you use TrueType fonts on a dot-matrix printer, Windows sends a rasterized graphics image to the printer. Dot-matrix printers do not provide any landscape device fonts, but vector screen fonts can be printed in any resolution or orientation. Dot-matrix device fonts are faster but less flexible than screen fonts.

Some 24-pin dot-matrix printers, such as Epson and NEC printers, also support font cards or cartridges. You can use these fonts if the Windows driver for your printer supports them.

HPPCL Printer Fonts

Printers that use HPPCL can print several different types of fonts. HPPCL printers can use font cartridges, downloadable soft fonts, vector screen fonts, and TrueType fonts. HPPCL printers cannot print Windows raster screen fonts.

When you use TrueType fonts on an HPPCL printer, TrueType performs all the font rendering in the computer and downloads bitmaps of the fonts. TrueType downloads only the specific characters needed in a document, not the entire font.

HPPCL Memory Tracking

If you use an HP LaserJet-compatible printer, be sure to accurately specify the amount of memory installed in your printer. This is important because the Windows HPPCL driver now tracks the available memory in your printer. You may get an out-of-printer-memory error or other errors if the memory is set incorrectly.

Downloadable Fonts

You can get HP LaserJet-compatible downloadable soft fonts from a number of sources, including Hewlett-Packard, Bitstream, SoftCraft, and CompuGraphics. Some downloadable font utilities also generate raster screen fonts for Windows. If an exact screen font match is not available, Windows uses one of its own screen fonts.

Hewlett-Packard downloadable fonts are installed with the Font Installer, while third-party HPPCL soft fonts are installed with their own installation utilities. To use the Font Installer, choose the Fonts button in the Printer Setup dialog box.

The Font Installer places soft font entries in the WIN.INI file under a section specific to a driver and port, such as [HPPCL,LPTx] (where x is the port number), as described later in this section. Because soft fonts are installed for a printer on a specific port, the soft fonts will not appear if you change the printer. To copy the soft font listings to another port, choose the Copy Fonts To New Port button in the Font Installer dialog box.

HPPCL fonts can be downloaded on either a temporary or a permanent basis. Temporary fonts are downloaded only when the HPPCL driver encounters a particular font while printing. At the end of the print job,

the soft font is discarded from the printer's memory. Printers such as the Apricot Laser and Kyocera F-1010, which require temporary soft fonts to be downloaded only at the start of a print job but not during the job, cannot use soft fonts with the Windows HPPCL driver.

HP Plotter Printer Fonts

Because plotters are vector devices, they can print only vector fonts. Plotters cannot print any kind of bitmap, including raster screen fonts and TrueType fonts. HP plotters include one internal vector font called Plotter. However, the Windows vector screen fonts Modern, Roman, and Script can be printed on HP plotters.

PostScript Printer Fonts

All PostScript fonts are scalable outlines that can be printed at any size. PostScript outline fonts can also be rotated to any angle and can be printed in both portrait and landscape modes. However, font size limitations are often imposed by applications. A common PostScript font size limitation in an application is 127 points.

Most PostScript printers include either the standard Apple LaserWriter Plus set of 35 scalable fonts or the earlier Apple LaserWriter set of 17 fonts.

PostScript soft fonts are installed with utilities provided by soft font vendors. Because the fonts are scalable, if there isn't a comparable screen font, mismatches can occur between screen display and printed output.

PostScript printers cannot print Windows raster screen fonts, although they can print vector screen fonts. Printing of Windows screen fonts is not usually necessary due to the large selection of resident fonts in a PostScript printer.

LaserWriter Plus Typefaces

The LaserWriter Plus standard font set includes 11 typefaces, 8 of which are available in roman, bold, italic, and bold italic. The Symbol typeface contains mathematical and scientific symbols, Zapf Chancery is a calligraphic specialty font, and Zapf Dingbats contains decorative bullet characters and embellishments. These typefaces are available only in roman style.

PostScript Printers and TrueType

TrueType fonts are treated as downloadable fonts by the PostScript driver. When you use TrueType fonts on a PostScript printer, scaling and hints are always performed in the computer. Scan conversion can be done in the computer or in the printer, depending on the point size. At smaller point sizes, TrueType performs scan conversion in the computer; at larger point sizes, scan conversion is done in the printer.

You can specify how to send TrueType fonts to your printer—for example, as bitmaps or in Adobe Type 1 format. To do this, in the Advanced Options dialog box of the Printer Setup command, select the method in the Send To Printer As list that you want to use for sending TrueType fonts.

If your PostScript printer supports downloadable fonts, you might want to use printer fonts in place of TrueType fonts to speed up printing and to use less printer memory. To do this, in the Advanced Options dialog box of the Printer Setup command, select the Use Printer Fonts For All TrueType Fonts check box. You can also map a TrueType font to a PostScript font in the [FontSubstitutes] section of the WIN.INI file; this will increase printing speed, but the results on the display may not be exactly the same as the printed output.

If your PostScript printer does not support downloadable fonts, you must use printer fonts to print any TrueType fonts in your documents. There are two ways to do this: allow the PostScript driver to print using the printer fonts that most closely match the TrueType fonts, or edit the Substitution Table to select the printer fonts you want to use, as described in the next section.

PostScript Downloadable Outline Fonts

PostScript printers also accept downloadable outline fonts, which can be scaled to any size and printed in both portrait and landscape orientations. Downloadable PostScript fonts are available from several suppliers, including Adobe and Bitstream. Both Adobe and Bitstream supply utilities that install the

fonts and add entries to the WIN.INI file. Because the font installation capability is included with these commercial font products, the Windows PostScript driver does not include a font installation utility.

Although PostScript downloadable outline fonts can be scaled to any size, Windows screen fonts cannot. You must install specific sizes of Windows screen fonts with the Adobe and Bitstream utilities. Install only the sizes you feel you will frequently use. If you specify a PostScript font size that does not have a corresponding screen font, Windows will substitute another screen font. This results in a little loss in display quality but, of course, no loss in print quality.

PostScript Cartridges

To use PostScript cartridges with Windows, you must use the PostScript printer driver. Choose the Printer icon in the Control Panel window and follow the steps for installing a printer, selecting the Apple LaserWriter Plus (PostScript) or another PostScript printer from the list in the Printer Setup dialog box.

PostScript cartridges are not supported directly by the Windows PostScript driver.

Substituting PostScript Fonts

You can edit the Substitution Table to specify which PostScript printer fonts you want to print in place of the TrueType fonts in your documents. The changes you make in the Substitution Table only affect the fonts that are printed. The fonts that appear on the screen will not change; the original TrueType fonts are still used to display TrueType text in your document.

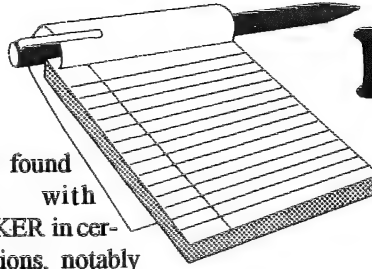
To specify which printer fonts to use, choose the Edit Substitution Table button in the Advanced Options dialog box of the Printer Setup command. Then select the TrueType font you want to replace from the For TrueType Font list in the Substitution dialog box. From the Use Printer Font list, select the PostScript printer font you want to use instead of the selected TrueType font. ○

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Consultant's Notepad

Geoff Harrod



MS-DOS 6.0

In last month's issue I wrote about why I don't recommend using any disk compression systems in a business environment. Since I wrote that, about two months ago, quite a storm has raged in America and elsewhere about problems with DOS 6's DoubleSpace system, and in fact about problems in other parts of DOS 6 also.

It was brought to a head when the very well reputed INFO WORLD weekly journal, that is famous for its thorough and authoritative reviews and testing, reported all sorts of problems with DOS 6 after testing in response to readers' reports and a rash of reports posted on Compuserve. They were able to verify many of the reported problems, but noted that they were extremely obscure bugs which probably explains why they escaped pre-release testing. Their major conclusion was:

The Info World Test Centre is convinced that DOS 6 with DoubleSpace compression installed can corrupt data on a variety of PCs and that the problems may not show up during the first several weeks of use. As a precaution, we recommend that any organisation that has installed DOS 6 not use DoubleSpace until Microsoft corrects the problems.

Not surprisingly, Microsoft were somewhat alarmed by this, and they sent their "SWAT" team in to Info World's testing lab. Info World had reported problems, many quite serious, on 53 systems they had monitored. The Microsoft SWAT team came up with explanations for all but six of those cases that blamed either human error by the testers or other software on the system.

The Info World editors published a report on it all the following week and admitted that some of the cases could be attributed to operational errors or software conflicts, but they were not completely convinced that the Microsoft team's findings completely exonerated DOS 6, and the remaining unexplained six cases involved serious file corruption.

They summarised:

We are still dubious about the advisability of widely deploying DOS 6.0 in a corporate environment before such problems are understood.

They also found problems with MEMMAKER in certain situations, notably involving SCSI drive controllers.

For my own part, on the strength of all I have heard and read, I cannot recommend DOS 6.0 and am not in any hurry to gain first hand experience either! My associates have had plenty of trouble with it on CAD machines and have had to replace it with DOS 5.0 on new machines before they could pass them on to clients in a workable condition. They found several key software elements including drivers and tape backup systems would not run under DOS 6.0. In view of the fact that DOS 6 does not bring any particularly worthwhile advantages apart from the bundled extras, there seems no sense in risking trouble.

SMARTDRV

The SWAT exercise at Info World revealed among other things that the "automatic installation of SMARTDRV without notification explains many of the 26 problems we attributed to DOS 6 in 53 machines tested". That was mainly a problem with its robbing other programs of extended memory that was expected to be available, rather than actual malfunction.

The other main problem concerned SMARTDRV's "lazy write" cache scheme. The testing batch programs rebooted 5 seconds after the last operation and SMARTDRV had still not finished writing the cache to disk.

This problem is not unique to SMARTDRV, but applies to any cache that caches writes as well as reads. However, most such caches do not return the DOS prompt when a program terminates until the cache has been flushed. SMARTDRV does and so gives no indication that all is ready.

I discovered an interesting fact about SMARTDRV 4 after discussing a problem with a BRISBUG member. His problem appeared to be due to delayed cache writing, yet SMARTDRV had been in-

stalled with no options, and the Windows manual (SMARTDRV 4 comes with Windows 3.1) stated that ver 4 introduces write cacheing but does not enable it by default and Microsoft do not recommend it be enabled because of the risk of data loss, although it certainly produces a noticeable disk access speed improvement. If you install it with a line such as

```
SMARTDRV.EXE 1024
```

it caches all drives including floppies and enables write cache on the hard drives! I can't see any sense in ever having a cache on floppies. I recommend you install SMARTDRV 4 thus (assuming for example that you have drives A B C and D):

```
SMARTDRV A- B- C D 1024
```

That disables it on the floppies and installs only read cache on the hard drives. Alternatively go back to using the less efficient, but safer, SMARTDRV.SYS from DOS 5.0. However, Windows 3.1 doesn't like that.

You certainly need some sort of disk cache. Machines without one are noticeably slow in many applications that make a lot of use of the disk or swap files. Some while back I replaced my old RLL drive with a new much bigger IDE type and the new drive had a hardware cache built into the drive. Even though only 256k, the much greater efficiency of the hardware system and being right in the drive electronics (not the controller) made it at least as effective as a 2 Meg software cache, and I was able to remove SMARTDRV without any noticeable speed deterioration. However, when I needed to re-install Windows it insisted on re-installing SMARTDRV!

I have heard several reports of problems that went away after removing SMARTDRV on DOS 5+Windows, but I think they were probably due to the write cache situation. It's all a bit confusing. Mixing system software parts from various suppliers is an understandable source of trouble, but you ought to be able to rely

on a plain default setup with all parts from the one operating system supplier.

"I HATE WORDPERFECT?"

Most of you probably know by now that the above could well be a quote from me. However (though true), it is in fact the title of a book! I noticed it when passing through BOOKWORLD. (Hard to miss; hot pink cover with big yellow black-shadowed title.) It is rather in the same vein as "DOS FOR DUMMIES", and I was intrigued by its approach and layout.

It is in fact a very good book for all those who have to learn to drive the beast even though they would prefer not to. It explains all the basics and particularly the more obscure basic tasks, all in an entertaining way that makes quite enjoyable reading.

It is also a good model for how to write an entertaining, or attention-keeping book on material that the readers would rather not be reading, which is true of most training manuals. Since I often write such things I think it will be useful on that score.

So if you need (or have) to use WordPerfect and find it hard (who doesn't?), this book will help. On the other hand, with Word, you don't need any manual at all! Guess what I use and recommend.

Support Charges

There is much in the computer press now about the moves by the big distributors to charge for software support. Readers may not be aware of all the factors that have led to this. Some companies are at present redudiating the idea, but I'm sure it is really just a temporary move to steal some advantage from competitors. The changes under way stem as much from the action of Government agencies as from commercial considerations.

Support, implemented at a level that provides real assistance as at Microsoft and WordPerfect, is an extremely expensive operation, and has to be financed somehow. It involves the employment of large numbers of skilled people for no other purpose, extra premises and very elaborate computer systems and telephone systems. Those companies who are taking swipes at rivals are usually providing free service you can never get due to inadequate phones and infrastructure.

Until now, the support costs have been paid out of the profit margin. This inevitably means the product could be sold for less if the margin was reduced by the support factor. They have been able to maintain this margin because of exclusive distribution rights.

The Prices Surveillance Authority has been investigating software pricing in Australia, and has recommended to Government that exclusive distribution rights should be abolished, legalising parallel importing and resale by anyone.

This may result in lower prices, though I doubt by very much. What it certainly means is that the Australian branches of such as Microsoft, WordPerfect, Borland, Lotus etc., will not be able to finance their huge support establishments from their margins.

The PSA propose that the support cost problem should be solved by charging separately for support, so that is the main reason why the moves are being made now.

So in future you will not be able to phone up and get help for some new product or upgrade. In fact, in some cases there may no longer be any central and authoritative place to ring for a particular product. It is quite likely some companies will close their Australian offices.

If you do ring a software producer's office for help you will be told you cannot get any without taking out a service contract, as is the case with many accounting systems already. The alternative arrangement would be a charge-back phone line, like the erotic fantasy lines, where your phone account gets surcharged by the minute and the provider gets the surcharge.

The big discount retailers like Harvey Norman and Brash's at present are able to wash their hands of providing any support as the producers' head office provides it. Where will you go when there is no such service? You will have to ring the States as they do in many other countries.

I know there are cases where the distributor's Australian price is high and virtually no support, or no useful support is provided. Those cases are now much rarer than they used to be, and the Australian prices have fallen too, quite generally.

There are some people who still advocate buying by mail order from the USA. Be

warned that it not so attractive as it sounds. Apart from the possibility of getting hit with excessive customs clearance fees by an agent who intercepts the parcel (even though there is almost no customs liable), the currently very unfavourable dollar ratio makes a bigger impact than many realise. Delivery charges are often as much as \$US35 or even up to \$US 80 for the modern huge software packs by international courier.

Perhaps service contracts or charge-back phone lines will be the fairer way: it will be a case of the needful pay instead of all those who don't need help subsidising those who do. Which way do you prefer?

Get the Pirates!

Beware, the BSAA is on the warpath! If you legally own all that you run you can rest easy. But if not...?

The BSAA's press release on 6 May commented that they have found much confusion among company directors and administrators as to what are breaches of copyright and who would be held responsible. Just as in many other aspects of employment, the head person and supervisors are held responsible for breaches of the law by their employees, and also so are the employees even if acting under supervisory orders.

They are stepping up their surveillance and investigation activity, and said in the press release...

The corporate and government sectors are the largest users and we will continue to closely monitor them, but we will now also target the small to medium business sector, bulletin boards and certain vertical markets such as CAD and design, with our most aggressive enforcement campaign to date. Piracy is high in small and medium business and in the home market.

They have started a "Dob in a Pirate" campaign which offers up to \$2,500 reward for tip-offs leading to successful prosecution. If you want to know more about the conditions, ring the Business Software Association of Australia's Piracy Hotline on 008-021143.

Be warned! Buy it or use Shareware or Public Domain.



New Listings

This month with a "Windows" bias

BBUG 9075 ANIMATED MULTIPLICATION & DIVISION (Disk 1 of 2, also 9076)

*CLASSIFICATION * Educational * Hard Disk * EGA/VGA * Mouse Support*

ANIMATED MULTIPLICATION and DIVISION is a program aimed primarily at children from first through third grades. Based on the multiplication table from 1 to 10, it teaches "mental math" in a painless way. Progressive help is given as needed when the student is having difficulty with a particular problem (not just a Wrong! response from the computer).

As rewards for successful completion of a sequence of ten problems a game room with several build-and-color-your-own animated games are given. The student can create and select a color scheme for their own dinosaur, car, face or fashion model.

BBUG 9076 ANIMATED MULTIPLICATION & DIVISION (Disk 2 of 2, also 9075)

BBUG 9077 APPLICATION LABEL GENERATOR Version 2.2

*CLASSIFICATION * Labels * Floppy/Hard Disk * Printer*

The APPLICATION LABEL GENERATOR is an application specifically designed for the shareware author. The APPLICATION LABEL GENERATOR will print the labels most used by the shareware author. Those labels are; 5.25" diskette labels, 3.5" diskette labels, Return labels, Product description labels, Disk size labels, New version labels.

The sole function of the APPLICATION

LABEL GENERATOR is to print labels. This package will most likely replace several applications or methods you currently use to label, serial number, and provide product labels for your shareware application. If you presently do not use any of these labels in your business then it will be easy to implement them with the Application Label Generator.

BBUG 9078 BIGTEXT Version 2.3

*CLASSIFICATION * Writing Aid * Hard Disk*

BIGTEXT turns ordinary text files into self-contained, self-displaying executable files. It is specifically designed to make self-displaying books, manuals, documents, and catalogues. The difference between BIGTEXT and similar programs is that it can handle genuinely BIG volumes of text (up to 600kb or more) and that it creates a single, neat and convenient executable file. Defining a menu, or a table of contents, and defining a customized information screen is easy. The text viewer programs you make are complete with a fast "find" feature which enables you to quickly find and go to any portion of the text. You can compress text during conversion to save both memory and disk space, enable or disable printing permission for a measure of security, and specify titles and screen colours. BIGTEXT can automatically run your favourite .exe file compressor and then helpfully test runs the final product for you.

If you have written a book but have not yet managed to have it published, this program is for you. You can turn your book into a single program which will fit on a 360k disk which you can distribute to your friends and interested parties.

BIGTEXT is also perfect for catalogues, with over fifty section entries available on the main menu.

Software developers can make self-displaying manuals for their programs. This minimizes complexity for the user and adds a level of security to the information.

BBUG 9079 BUDDY Version 1.2

*CLASSIFICATION * Educational * Floppy/Hard Disk*

BUDDY is a Tutorial Companion for clearer, more powerful writing using any word processor.

Are you already pretty good with your word processor? Now in just eight (8) lessons you can

(a) write more effectively and (b) avoid some embarrassing common writing errors.

BUDDY works with any word processor, but is NOT a tutorial in using a word processor itself

BUDDY also lets you enjoy wacky banter with your PC—as "comic relief" to the very serious business of clear and strategic writing.

BBUG 9080 THE BILLIT PROGRAM Version 3.1

*CLASSIFICATION * Business * Floppy/Hard Disk * Dot Matrix/Laser Printer*

Do you need a simple billing program for that occasional invoice you need to send?

THE BILLIT PROGRAM is just the program you have been looking for. With THE BILLIT PROGRAM you can prepare a professional-looking Invoice/Statement from your own computer and keep a record of your dealings. The program can also prepare your own Purchase Orders.

Both Invoices and Purchase Orders can be automatically numbered with the option to change numbers at any time.

All Invoices and Purchase orders are be printed on plain paper and copies can be produced using the same invoice number as well as having additional pages numbered - no need to buy special stationery. A 5000 customer address database ensures complete records are maintained, 17 descriptions/unit price commonly used in invoicing is included as well as an automatic calculator of unit price by quantity.

BBUG 9081 DARE TO DREAM

*CLASSIFICATION * Games * Windows * Hard Disk * Sound Card Supported HIGH DENSITY DISK*

Over the past few evenings, Tyler has been having extremely vivid and detailed dreams,

dreams in which he meets odd characters and gets into very strange puzzles. Tonight Tyler falls asleep after a particularly bad day. Suddenly he awakens in a deserted alleyway in an unfamiliar city. He wipes himself off, stands up, and begins to piece together the puzzles that will unlock his happiest and most sinister thoughts, resulting in a confrontation with evil that lurks in all of us.

DARE TO DREAM is a graphical adventure game for Microsoft Windows. Set in the style of other popular adventures, such as King's Quest and Leisure Suit Larry, you explore many vividly-illustrated areas, solving puzzles and using objects you find along the way. DARE TO DREAM is very easy to learn, yet it's quite a challenging game once you get past the first few puzzles. Detailed cinematic animated scenes, as well as an ever-changing sound track make DARE TO DREAM quite enjoyable for both novices and experienced adventure gamers.

BBUG 9082 CONFOUND

*CLASSIFICATION * Games * Windows * Hard Disk * Colour Monitor*

CONFOUND is a strategy game - you against the computer, but the computer has the advantage. You and the computer start off with 2 "pegs" and 2 home squares. Each move you make gives you a choice - build or move. To win the game, you need to get one of your pegs onto one of the computers home squares.

BBUG 9083 VBRUN 200

*CLASSIFICATION * Utilities * Windows * Hard Disk*

VBRUN200.DLL is the runtime module necessary for programs written in Visual Basic to operate under Windows. Simply copy this file to your Windows sub-directory to enable programs written in VB to function.

BBUG 9084 PROVIEW Version 1.01

*CLASSIFICATION * Utilities * Windows * Hard Disk*

PROVIEW for Windows is a program used to analyze, view and edit the basic components of a system, including the system memory, system interrupts, device drivers, CMOS and installed disk drive sectors and file contents. PROVIEW will allow you to view system elements in HEX, ASCII or disassembled code format. Full searching and editing functions are included. It also provides a system audit function to determine whether programs have been added to a system, deleted from a system or have been changed since the last audit.

PROVIEW displays data in real time. For

example, if you are viewing a memory location that is being updated by the system (the clock interrupt, for example), PROVIEW will display the changes as they occur.

PROVIEW provides an extensive on-line context-sensitive help function. At any point in the program you may press the <F1> key to display help text for the process you are currently engaged in.

PROVIEW is Novell Network aware. You may view any network file and edit any network file that is not locked.

BBUG 9085 WINDOWS UTILITIES #8

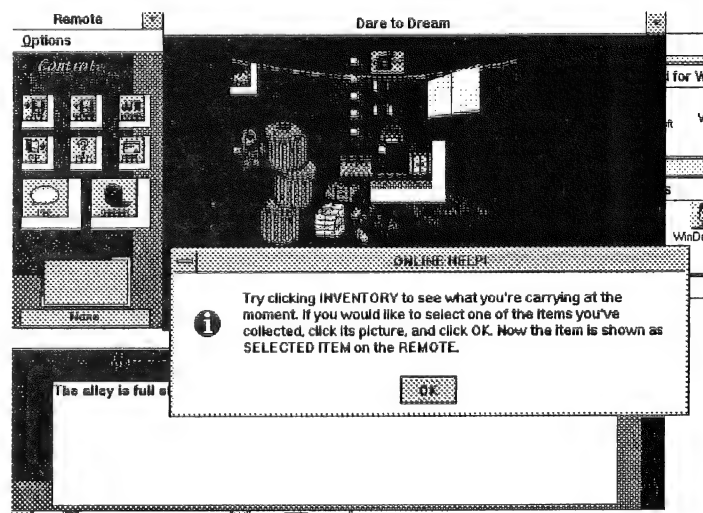
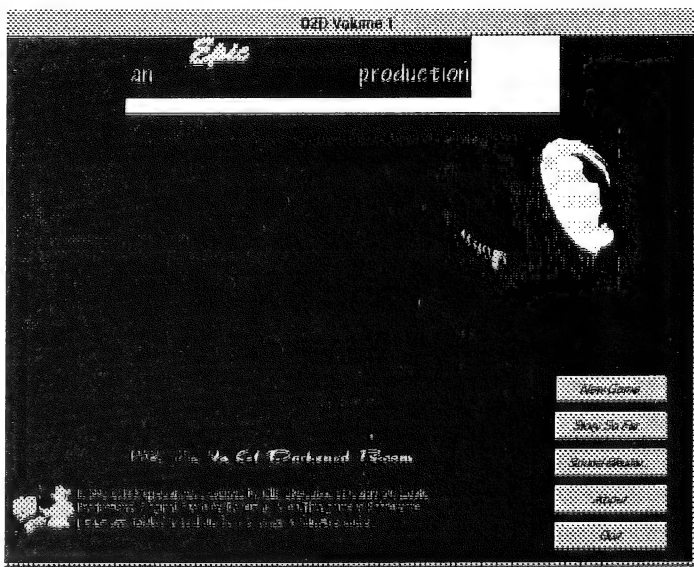
*CLASSIFICATION * Utilities * Windows * Hard Disk*

CIRCULAR FILE Version 1.0 is a drag and drop file deletion/restoration utility. It simplifies your file management and provides you with a backup when you mistakenly delete a file. You simply select the files you want to delete in File Manager and drag and drop them onto Circular File. This deletes them. Now to restore a file you simply select it in Circular File and press restore. The file is restored to its original location.

DLL Master lists all modules currently loaded in Windows' memory, and allows you to load, unload, or decrement the use count of DLLs—at your own risk, of course. Module path, date, time and filesize are shown; multiple lists are kept, lists can be compared, and printed or saved to disk. Specific DLLs can also be loaded at Windows' startup.

DLL Master requires the runtime module VBRUN200.DLL

EXODUS Version 1.0 is a Windows exiting program. It allows you to exit Windows in one of four convenient ways. 1. Exit Windows to



With on-line help and on-line hints for new users (which pop up when you haven't done anything, except scratch your head, for a significant time, dare to dream is a very switched-on game

Dos. 2. Exit and restart Windows immediately. 3. Exit Windows, run a Dos program, and restart Windows when finished. 4. Exit Windows and reboot your system.

OUTSIDE! Version 2A. Certain DOS-based programs just don't run well in a DOS session under Windows 386 Enhanced Mode. Programs with high resolution video or support for sound boards sometimes need more system resources that Windows is willing to give up. The result is often slow, jerky motion or garbled sound. There are also disk and memory utilities that can't be run in multitasking environments.

OUTSIDE! uses a special Windows API function call to terminate Windows, run the program you specify (under DOS), and automatically reload Windows.

BBUG 9086 WINDOWS UTILITIES #9

*CLASSIFICATION * Utilities * Windows *
Hard Disk*

SENSE Version 1.0E is a little utility for Windows. It activates a window by just moving the mouse cursor in it. The program works together with all kinds of windows. (MDI, etc.)

WINLOCK protects your Windows and LAN environment from unauthorized users. The easy to use security features locks Windows at start up, on demand, and automatically when you away from your desk. When locked all mouse and keyboard activity is restricted. Intruders are met with a flashing red screen, an audible alarm, and deterrent messages. The security audit trail provides you with a record of unauthorized password attempts. Your Windows environment remains secure even when your PC is rebooted from floppy.

Since, WinLock is compatible with most commercially available screen savers you can enable your favorite screensaver without locking your system. WinLock provides an additional level of security to any Novell, LAN Manager, or Banyan network.

BBUG 9087 WINBACK Version 3.1C

*CLASSIFICATION * Utilities * Windows *
Hard Disk*

WINBACK is the perfect Windows backup program for the home computer user. Easy to use, no technical manuals to read or cryptic commands to memorize. Totally mouse driven Windows interface. Includes functions for backing up your complete hard drive or Single program directories. File Copy function can be configured to backup all your vital windows system files along with all work files from any program. Auto Restore disk will restore your programs to any formatted hard drive, even an empty one.

Requires VBRUN200.DLL (BBUG DISK #9083)

BBUG 9088 WINBAG Version 2.1

*CLASSIFICATION * Utilities * Windows *
Hard Disk * VGA*

WINBAG is a toolbag of utilities for Windows that lets you do some of the things you do at DOS, without going to the dreaded File Manager and without leaving the Windows environment.

WBFormat is used to format diskettes in foreground or background. When first run, defaults will be set up for drives, format, and DOS version.

WBFileMan - WINBAGS File Manager gives you a tool for day-to-day file management. Also, WBFileMan gives you a powerful View/Edit command as well as easy Zip/UNZip capability.

DirA/DirB - The two Dir utilities are tools that do the simple task of a dir on drive a: or b:, but, they do it without the need to exit to DOS and they can be minimized and brought back to life at any time.

BBUG 9089 ICON MANAGER and ICON LIBRARIAN

*CLASSIFICATION * Utilities * Windows *
Hard Disk*

ICON MANAGER Version 3.2 is a powerful tool for working with icons in the Windows operating environment. The same drag-and-drop interface used by Program Manager allows icons to easily be moved, copied, and organized into files within ICON MANAGER.

Unlike other applications which offer awkward procedures for installing icons into Program Manager, ICON MANAGER will install icons into Program Manager or Norton Desktop DIRECTLY using the wizardry of Windows' Dynamic Data Exchange. For those who would like to create or edit their own icons, ICON MANAGER taps the power of OLE to whisk you into a edit session with Paintbrush by just double-clicking on an icon. All of these features and more make ICON MANAGER the most complete icon tool available for the Windows operating environment.

ICON LIBRARIAN Version 1.0. If you are a regular Windows user, then you have no doubt had to struggle to keep up with the multitude of icons available today. The ICON LIBRARIAN makes manipulation of these icons easy; you can categorize, delete, and choose icons

from up to 100 user-defined categories with up to 1,000 icons each) with intuitive drag-and-drop operations. The Librarian keeps its icons in space-efficient library files, so you'll save valuable disk space, too. Icons can be imported into your libraries from ICO, EXE, DLL, Norton Library, and PC Tools .ICL files.

Developers will also find the Librarian very useful. It will allow you to keep your development icons in well-defined categories (buttons, hardware, etc.) without wasting disk space by having multitudes of small .ICO files on your hard drive.

BBUG 9090 SOLITAIRE GOLF

*CLASSIFICATION * Games * Windows *
Hard Disk * EGA/VGA*

Are you tired of the Windows game of Solitaire? Maybe a change is in order. SOLITAIRE GOLF is a very simple solitaire game that, while making no great demands, offers some chance for skill.

Five overlapping rows of seven cards are dealt face up to form the Tableau. One card is dealt below these to start the wastepile. The remaining cards are placed face down on the left.

The object is to clear away the Tableau by building cards onto the wastepile. Building is in sequence, up or down, regardless of suit.

BBUG 9091 PHONEBAR Version 1.0

*CLASSIFICATION * Communications * Win-
dows * Hard Disk*

Using your computer to store phone numbers is a great way to make your computer work for you, but when you need to find a friend's phone number in a hurry, and you are in the middle of a Windows program, it is always a problem to

BREEZE

An easy to use text editor/word processor that does everything you ever wanted of an editor, and more! BREEZE has been designed with one thing in mind.....
PLEASURE.

The simplicity of BREEZE is a breath of fresh air, compared to the oppressive and boring alternatives. It's "Queensland Made" by local author Kevin Solway.

Features include:

Easy to use Hypertext help system; Multi-Menu environment; RAM dictionary; Scientific Calculator and lots more...

Shareware Version available on BBUG DISK # 8678

SPECIAL OFFER

Cut out (or photocopy) this ad and send it together with the registration form from the Shareware Program to:

Kevin Solway, P.O. Box 207, University of Queensland, ST LUCIA, Qld 4067

and receive the latest Registered Version of BREEZE for only \$30.00
(Normally \$43.00 (including postage))

EXTRA BONUS

Get a registered copy of BIGTEXT (BBUG DISK # 9078) for only \$19.00 extra.
TOTAL VALUE \$73.00 for only \$49.00

shell out to your phone directory to look up the number.

PHONEBAR will ease your task. PHONEBAR can store up to 100 phone entries, with automatic loading on start up and automatic saving on exit. With its small desktop footprint and its high speed and minimal resource drain, PHONEBAR can be left active all the time you are running Windows.

GAME OF THE MONTH

BBUG 9092 CASTLE OF THE WINDS Version 1.0

*CLASSIFICATION * Games * Windows * HardDisk * EGA/VGA HIGH DENSITY DISK*

CASTLE OF THE WINDS is a fantasy role playing game. Your quest begins with A Question of Vengeance, as you try to discover the secret of your mysterious past, and why it has proven so deadly to those you love. It then continues with Lifthransir's Bane, as you attempt to vanquish the dark forces of evil which plague the land and are after your life!

Set in the world of Norse mythology, this game has plenty of surprises. Nearly a hundred unique monsters oppose your quest, and there are hundreds of enchanted objects to aid you. CASTLE OF THE WINDS presents a new style of adventure game. While the anchor points of the story remain the same, most of the adventure is created anew every time you play, so the game can be enjoyed again and again.

Fans of fantasy and adventure games will love this one. With over three years in development, this game beats commercial Windows

games hands down, and extensive online help gets you off to a great start on your journey.

BBUG 9093 SLIDER Version 1.0

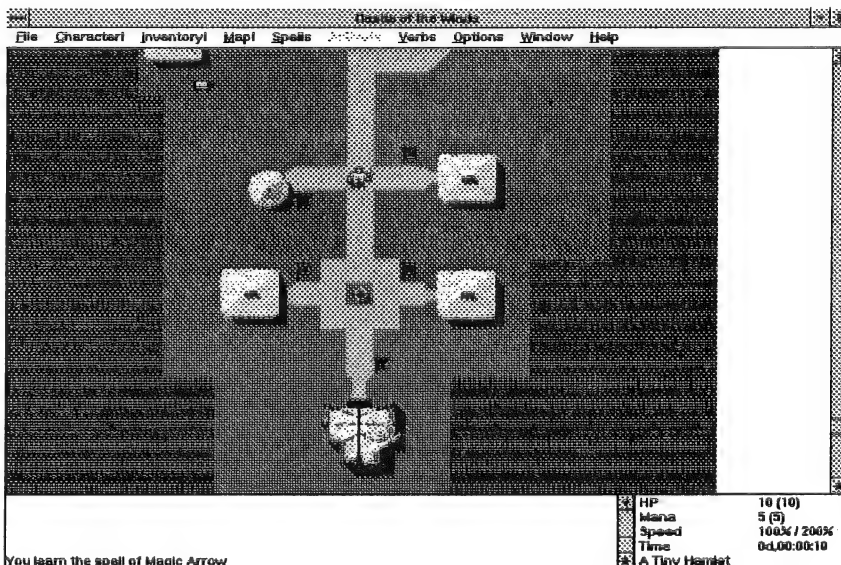
*CLASSIFICATION * Games * Windows * Hard Disk*

SLIDER - "Save the Earth" Sliding Block Puzzle for Windows is another puzzle designed to reduce productivity in Windows. In this case you are presented with the task of moving the Earth from one side of the playing field to the exit on the other side. Filling most of the intervening space are blocks of various sizes that have to be jockeyed around like cars

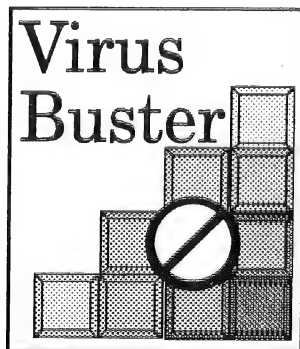
BBUG 9094 EARLY SPANISH Version 1.5SW (Disk 1 of 2, also 9095)

*CLASSIFICATION * Educational * Windows * Hard Disk * EGA/VGA * Sound Card*

EARLY SPANISH is the first BI-LINGUAL package (ENGLISH & SPANISH) for children age 1 thru 14. This package will teach your child how to speak Spanish. The English speech will gradually fade in to all Spanish Speech and your child will start to memorize Spanish words and numbers while they are learn basic mathematics.



Castle of the Winds is a fantasy game set in the world of Norse mythology. Highly recommended for the imaginative game fancier.



Virus Buster

from **Leprechaun** SOFTWARE

NOW AVAILABLE

\$120.00 (P & H - \$5.00)

SPECIAL UPGRADE OFFER

Brisbug Members who own earlier Versions of Virus Buster can now upgrade to Version 4 at a special price of \$50.00 plus P & H. (Normal price \$65.00)

Offer expires 30 November 1993

EARLY SPANISH is a fabulous TALKING TEACHER with real human speech that helps children learn how to SAY NUMBERS, COUNTING, REMEMBER PHONE NUMBERS, ADDITION, SUBTRACTION, and muchmore. EARLY SPANISH allows parents and teachers to record their own voice in to the package and use the new voice to teach their children and students. You can record any language in to this package.

Lead you child into the next century with this program.

BBUG 9095 EARLY SPANISH
Version 1.5SW (Disk 2 of 2, also 9094)

BBUG 9096 SHOW 'N SPELL

CLASSIFICATION Educational* HardDisk
* EGA/VGA * Mouse Supported*

SHOW 'N SPELL is a fun way for children (and adults?) to increase their spelling skills!

Random pictures appear for the user to identify and spell. 3 different skill levels are available to choose from, along with several play options (reveal clues, play against the clock, display word skeleton dashes).

BBUG 9097 IDE INFORMATION UTILITIES

CLASSIFICATION Technical Information* Floppy Disk*

This disk contains a collection of IDE utilities designed to supply information to the user on types of IDE hard drives used in the computer.

Three utilities from Western Digital: WDAT_IDE is a Western Digital IDE drive diagnostic and formatting utility. IDEDIAG examines your Western Digital drive and returns information about it. PARKIDE puts your IDE drive in the "sleep" mode unique to IDE drives—your computer stays on but your IDE drive is both parked and stopped (spun down). The C:> prompt is returned; then IDE drive will automatically spin up and return to full operation should you access it.

IDEID is an IDE IDENTIFICATION UTILITY Version 1.10 which will get information on the drives manufacturer, serial number, parameters and specifications.

IDEINFO Version 1.0 displays information about the IDE (Integrated Drive Electronic) drives in an AT computer. It issues a standard IDE drive command that requests information about the drive. This information is then displayed on the screen.

The information returned by the drive includes the physical number of cylinders/heads/sectors; buffer size; number of ECC bytes trans-

SOFTWARE LIBRARY NEWS

SCAN and CLEAN

From this month SCAN and CLEAN programs will not be supplied on the Catalog Disks. Because of the ever increasing size of these programs, especially CLEAN, it is becoming impossible to supply them on the Catalog disks.

A new ANTI-VIRUS program disk(s) will be available in the following formats: 5.25" 360K (3 disks), 5.25" 1.2M (1 disk) and 3.5" 1.4M (1 disk). The ANTI-VIRUS program will no be available on 3.5" 720K format.

The cost for the ANTI-VIRUS programs is \$4.00 and these can be purchased from the Software Shop or by mail from the Software Library. It is anticipated that each month (depending on receipt of the latest versions) the disks can be upgraded - cost \$2.00.

The ANTI-VIRUS disks will contain: SCAN, CLEAN, M-DISK, VSHIELD, CCP11, PV12, VALIDATE and WSCAN (Windows SCAN) as well as an installation program to install the programs on your hard disk. To install the programs type "GO" and the program will do the rest. You will need to change your path statement in your AUTOEXEC.BAT to include the ANTIVIRUS directory in the path before you can access SCAN to check for viruses on your computer.

The install program will ask you if you wish to extract WSCAN, so if you do not have Windows on your computer, you can tell the program that you do not wish to have WSCAN on your hard disk. The 3.5" 1.4M disk also contains OS2SCAN and OS2CLEAN for those who use OS2 and you can skip these files if you do not operate your system under OS2.

For those members who do not have a hard disk, SCAN and CLEAN should be copied to a blank floppy disk, and the programs extracted manually.

VIRUS BUSTER

Following last months meeting and the presentation by Liz Gunn from Leprechaun Software, supplies of VIRUS BUSTER are again available from the Software Shop. Price - \$120.00 (Packing and postage \$5.00) Place your order now!

UPGRADE VIRUS BUSTER

Members who own earlier versions of VIRUS BUSTER can now upgrade to the latest version at a special price. Normal Price to upgrade to Version 4 is \$65.00, and by courtesy of Liz Gunn, a SPECIAL price of \$50.00 (plus postage and handling) is now available.

BREEZE

Local Programmer, Kevin Solway has just released his latest version of BREEZE, and has made a special offer to Brisbug Members for registered copies. Check the advertisement in this months edition and cut-out (or photocopy) the ad and send it to Kevin if you wish to take advantage of this offer. The latest version (shareware) is available on BBUG DISK NO. #8578.

HELP WANTED

Thanks to the volunteers who assisted at last months meeting, the Software Library Staff had much easier time acclimatizing themselves to the new venue. Setting up of the Library and Software Shop still requires willing helpers, especially before opening, setting up tables, bringing in all stock and library disks, and again after the library has closed, packing up and returning the room to its original condition.

If you would like to help, before classes or after the conclusion of the main meeting please see either Brian Sanborn or Terry Tuttle in the library.

ferred; and the drive's model number, serial number, and firmware revision level.

BBUG 9098 MENU-WIZARD Version 4.0

*CLASSIFICATION * Menu * Hard Disk*

MENU-WIZARD is a very powerful and easy to use PC Menu program. The program offers mouse support, an automatic and manual screen saver, Pop-Up Calculator, Calendar, File Viewer and Editor along with an ASCII table. Password loading of menu entries and keyboard locking is supported along with the ability to disable menu options.

MENU-WIZARD is not memory resident. The program is able to unload itself completely from memory, turn over control to the program you wish to run, and then automatically reload itself.

BBUG 9099 LOTTOPROF Version 3.1

*CLASSIFICATION * Games * Hard Disk * Printer*

Increase your winning chances. Leverage your playing power with the LOTTOPROF advantage!

LOTTOPROF examines any bet combination you might play and tells you your chances of winning. Then shows you in a graph how it compares to others. That way, for however much money you want to wager, LOTTOPROF shows you the best play for your betting dollar.

LOTTOPROF supports almost any 5-ball or 6-ball game, making it easy to keep track of your lottery's winning numbers. You can view the winning numbers in a graph, see which ones are hitting most often, and save your favorite numbers for later play.

Keep track of the wagers you make in your own Player Program. When the latest drawing re-

sults are in, LOTTOPROF will easily find your winning tickets. And quickly tally your winnings.

Eliminate the tedium of marking bet slips by hand. If you have a LaserJet printer, LOTTOPROF will print your bet slips for you!

LOTTOPROF is your complete lottery playing companion. Without it you are wasting money!

BBS GUIDE

Copies of the BRISBUG BBS GUIDE are available from the Software Shop for \$10.00 each. If you are interested in using the BBS, I cannot recommend too highly that you purchase a copy of this book before logging on to the Brisbug BBS.

\$ 10

BBUG 9100 MOVIE LOG

*CLASSIFICATION * General * Hard Disk * Printer*

MOVIELOG - The Video Movie Log Database Program is a program to help you keep track of all those video tapes that tend to collect around the house. If you have managed to collect quite a few, after all with the cost of new release video tapes at about \$10.00 - \$20.00 it almost seems like a false economy to rent them rather than to simply buy them! Some of these tapes are only available for a short time and so you might want to add these to your collection while they are still available!

Once you get all of these tapes, how are you going to keep track of them? MOVIELOG can solve these problems. Features include: Mouse driven interface with pull down menus: Large capacity to store movies: This program will hold approximately 400,000,000 movies. Quick retrieval of any movie on file: Ability to determine your own movie categories: Ability to print various lists of your movies in various ways: On-Line help available from a menu selection.

MultiMedia for under \$1000

New release

Sound Galaxy NXPro (*the* most compatible) sound card, CD-ROM, Stereo microphone, Stereo Speakers

plus all necessary software

plus

10 CD-ROMs including World Atlas, Guinness Disk of Records, and Battle Chess

\$999

Free fitting advice, or we'll install it for a small fee

Ron Lewis Computers

12 Firelight Street, SUNNYBANK HILLS

(07) 273 8946 FAX (07) 273 8954 MOB 018 151747

DISK PRICES

5.25" Disks - \$4.00 each

3.5" Disks - \$5.50 each

High Density Disks (Special Programs only as advertised)
\$8.00 each

Postage Up to 8 disks \$3.00
Over 8 disks \$5.00

**CREDIT CARD MINIMUM
\$25.00**

BRISBUG HELP LINES

The following members have generously offered to give telephone assistance on the topics listed. Please be sure to observe the restrictions on times specified by each person. This service is not intended to serve as on-going training or a substitute for reading the manuals, or for

not having manuals. It is for assistance with particular difficulties and for general advice such as when considering becoming involved in that topic.

New offers of help are always welcome, and there are some topics absent from the list.

Subject	Name	Phone	Days & times
4DOS	Chris Raisin	379-1415	Any time
Accounting	Ian Haly	870-1463	After 5:30 & W/Ends
As-Easy-As	Dan Bridges	345-9298	Anytime
	Dan Emerson	288-6070	
AutoCad	Geoff Harrod	378-8534	Evenings, W/E
C language	Danny Thomas	371-7938	Mon-Fri 6pm-9 & W/E
	Ian Haly	870-1463	After 5:30 & W/E
Clarion	Ray Creighton	354-1107	eve & W/E
Clipper	Chris Raisin	379-1415	Evenings
	Don Andersen	881-2432	after 7pm & W/E
	Dan Emerson	288-6070	
	Mike Theocharous	824-1450	Anytime
CodeBase	Ian Haly	870-1463	After 5:30 & W/E
Communications	Ron Lewis	273-8946	8am-8pm
Dataflex	Tony Obermeit	2875534	Mon-Sat A/Hrs & Sun
dBase	Ian Haly	870-1463	After 5:30 & W/E
	Mike Theocharous	824-1450	Anytime
	Sylvia Willie	393-3388	Evenings
	Bob Boon	209-1931	M-F 8am-5pm
	Chris Raisin	379-1415	Any time
	Dan Emerson	288-6070	Evenings
DBXL	Ian Haly	870-1463	After 5:30 & W/E
DisplayWrite 4	Mike Lester	275-1742	(343-5703 a/hrs)
DOS	Ron Lewis	273-8946	8am - 8pm
Forth	Danny Thomas	371-7938	M-F 5-9, W/E
Fortran	Cec Chardon	870-1812	Evenings
	Rob Andamson	266-8353	Evenings
Fox/Fox-Pro	Leon Percy	808-1570	Evenings
Genealogy	Rob Adamson	266-8353	Evenings
	Colin Cunningham	263-3005	9-9 all days
	Bob Gurney	355-4982	Mon-Sat 8-8
Hardware	Chris Ossowski	274-4144	9-9 all days
	Ron Lewis	273 8946	8-8 weekdays
Help!	Dan Bridges	345-9298	Anytime
Meta 5	David Shaw	870-3633	9-9 all days

MS Word	Chris Raisin	379-1415	Any time
Multimate	Frank Mehr	397-3984	Anytime
Multi-user DOS	David Shaw	870-3633	9am-9pm
Novell Netware	Dan Emerson	288-6070	Evenings
Open Access 2	Cec Chardon	870-1812	Evenings
OS/2	Alan Gibson	207-2118	6:30-9:30pm
PostScript	Danny Thomas	371-7938	M-F 5-9 & W/E
PowerBase	Mike Lester	275-1742	(343-5703 A/hrs)
Project Manage- ment & planning	Brian Doyle	355-1328	9am - 9pm all days
Quick-BASIC 4.5	Harry Strybos	288-5145	4pm-7pm Weekdays
Quicksilver	Ian Haly	870-1463	M-F after 5:30 & W/E
R-Base	Tony Luck	279-3033	9-9 all days
Spreadsheets	Sylvia Willie	393-3388	Evenings
SQL	Cec Chardon	870-1812	Evenings
System Manager	David Shaw	870-3633	9-9 all days
True-Basic	Bob Gurney	355-4982	Mon-Sat 8-8
Unix	Paul Watts	892-2226	Mon-Sat a/hrs & Sun
Windows	Bernard Speight	349-6677	6pm-9pm
Wordstar (all ver)	Neil McPherson	075-971240	A/hrs
Wordstar-2000/4	Bob Boon	209-1931	Mon-Fri 8-5
Xenix	Paul Watts	892-2226	Mon-Sat a/hrs, Sun
	Mike Lester	275-1742	(343-5703 a/hrs)

MEETINGS

Meetings are held on the 3rd Sunday of every month, except under unusual circumstances, at

QUT KELVINGROVE CAMPUS

Victoria Park Road
Kelvin Grove, Brisbane 10am to 5pm.

Brisbug occupies the main lecture theatre and several other lecture rooms in "B" Block. Please note that other groups are usually using the campus at the same time, and that parking is permitted only in the designated areas. Disabled access is available

Food and refreshments are available 11:30-2:00. Alcohol is not permitted.

Members and visitors must wear an identity badge available from the Membership desk.

Program for Sunday, 15th August, 1993

10:00am	CLASSES		
	Introduction to DOS	John Tacey	R315
	Introduction to dBase IV	Dan Emerson	R302
	Hardware	Ron Lewis	Theatre
	QBASIC	Rex Ramsey	R309
	C++	Geoff Baker	R313
	xBase	Leon Percy	R310
12:00	ET Fax System	Key Systems	Theatre
12:00	JUNIOR GROUP	Les Cathcart	R301
12:15	NEW MEMBERS ORIENTATION		R310
1:00	CLUB MEETING		Theatre
1:30	WORDPERFECT		Theatre
3:00	New Members Discussion Group		R301
	Environment Monitoring	Dan Emerson	R302
	New Users Course	Chris Raisin	R309
	SIGs	(Check noticeboard for locations)	

Education News

Ron Kelly

The following Educational Courses and 'Need to Know' Groups which will be available at our August Club Meeting.

Morning Lectures - 10:00 to 12:00

NEW USER:

GETTING TO KNOW YOUR COMPUTER

John Tacey Room 315.

COURSE : Introduction to dBASE IV

Dan Emerson.... Room 302

NOT SO NEW USER:

COURSE: **Hardware**

Ron Lewis..... Auditorium

ADVANCED:

COURSE : **BASIC the Language....**

Rex Ramsey Room 309

COURSE : **'C++' Language**

Geoff Baker Room 313

COURSE : **X Base**

Leon Percy Room 310

Lunchtime

NEW MEMBERS ORIENTATION GROUP

12.15pm to 12.45pm ... Room 310

This meeting will give some indication as to what makes Brisbane tick.

All Day (10:00 - 3:00)

JUNIOR EDUCATIONAL GROUP

Les Cathcart.... Room 301

Total Period : 10.00am to 3.00pm

Includes -

10.00am to noon — General Instruction.

noon to 1.30pm. — Windows Session.

1.30pm. to 3pm. — Discussion on Dos 6

Afternoon Lectures - 3:15 pm

NEW USER:

COURSE : GETTING TO KNOW
YOUR COMPUTER

Chris Raisin.... Room 309

ADVANCED:

COURSE : Information retrieval

Dan Emerson Room 302



Maestro 144FM considered the BEST value for money Fax Modem around. Available to Brisbane members for \$469.00 Internal & \$569.00 External.

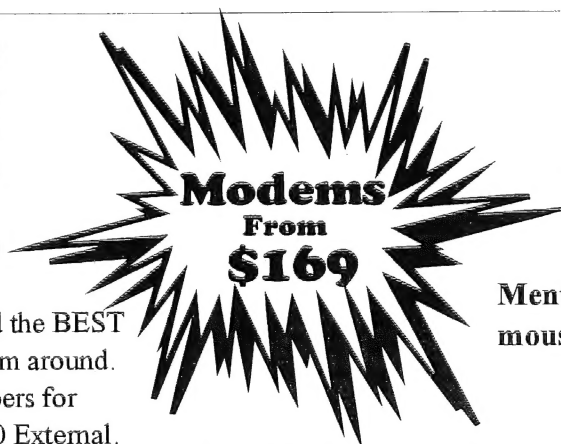
SYSTEMS

386DX-40 Vesa

130MB Hdd, 4Mb Ram,
1.44Fdd, 512 Vga, Multi I/O,
101 Keyboard, M'Twr,
SVGA Monitor - \$1349

486DX-33 Vesa

130MB Hdd, 4Mb Ram,
1.44Fdd, 512 Vga, Multi I/O,
101 Keyboard, M'Twr,
SVGA Monitor - \$2249



SPECIALS

MOTHERBOARDS

486DX-33V 2 x Vesa Slots \$799
486DX-50V 2 x Vesa Slots \$1099
486DX2-66V 2 x Vesa Slots \$1249

HARD DRIVES

212Mb WD Sub 14m/s \$419
256Mb WD Sub 13m/s \$489
341Mb WD Sub 13m/s \$649

PRINTERS

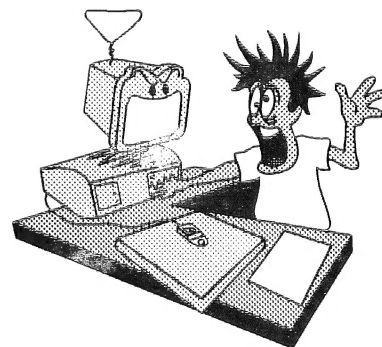
Panasonic 9 Pin Dot Matrix \$279
Samsung 24 Pin Dot Matrix \$369



COMPUTER HAND HOLDING

Ph: (07) 3660623 Fax: (07) 3660624
109 Lewin St Bardon Qld 4065

Mention this ad and receive a free mouse mat with any order over \$50.



Are you fighting your computer, or is your computer fighting you? Then ask us for help. From tips for fine tuning your setup to upgrades or new systems.

SUITE DREAM

The first fully integrated office software suite to combine the best word processor, spread sheet and relational database.

CRAZY INTRODUCTORY PRICE!

\$795

FOR ALL 3 (VALUE \$2,650 RRP)



Best Processor



Best Spreadsheet



* (WordPerfect® for Windows V1.0) BYTE'S 1992 Readers' Choice Award

* (Paradox® for Windows V1.0) P.C. Magazine's Editors' Choice Award '92

* (Quattro Pro® for Windows V1.0) InfoWorld's 1992 Product of the Year

This is the one you've been waiting for. Compare the Borland Office for Windows with any other suite and you'll see it gives you a combination of products that provides a more comprehensive and useful business information system. WordPerfect® 5.2 for Windows has all the power to make word processing quick and easy. Quattro® Pro for Windows is the obvious upgrade for Lotus 1-2-3 and Excel users and features built-in presentation graphics that rival stand alone packages. Add to that Paradox® for Windows relational database, and you've got everything you need to create graphical applications fast. These 3 award winners all together in one pack for a crazy low price really is a Suite Dream. CALL 008 814 224 or (02) 911 1033 for more information or see your nearest dealer. Hurry!

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